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Mole Philosophy & Other Essays

Cassius J. Keyser

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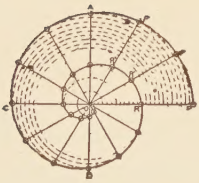

By the same Author

MATHEMATICAL PHILOSOPHY
[*E. P. Dutton & Company*]

THINKING ABOUT THINKING
[*E. P. Dutton & Company*]

THE HUMAN WORTH OF
RIGOROUS THINKING
[*The Columbia University Press*]

SCIENCE AND RELIGION
[*The Yale University Press*]

THE NEW INFINITE AND THE
OLD THEOLOGY
[*The Yale University Press*]

Mole Philosophy

&

Other Essays

By Cassius J. Keyser, Ph.D., LL.D.

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To
the memory of
my wife

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Preface

THIS VOLUME is composed of miscellaneous essays. Each of the essays has a unity of its own. But taken together they do not constitute, and they are not offered as constituting, a single whole in the philosophic sense of this term. To attempt to judge them as so many connected chapters in a discussion of one subject because they exist here side by side in one volume would, of course, be unjust and absurd.

Most of the essays were written to purge what I sometimes find it convenient to call my mind of certain precipitates of experience and meditation. In general, it is not their aim to inform or to reform the world or even to save it. Hence they may do a little good.

They are short because, upon reaching the happy age of three score years a half-decade ago, I had learned fairly well the difficult lesson that, when one has said in an essay what one desired to say in it, the essay should end. It is evident that there is no essential connection between the length and the quality of an essay. A short one may be good or bad; so, too, a long one. A brief essay, if it have merit, will give light but the light will emanate from a single idea like the radiance of a lone star;

a long one must give the composite light of a group of ideas like the radiance of a constellation. Preference for the one kind or the other will naturally depend on the varying mood of the reader. Personally I have often felt grateful to such thinkers as Francis Bacon, for example, or Anatole France for including among their essays so many fine specimens of the lone star type.

The main thesis submitted in *The Significance of Death* I believe to be true. Unless I am mistaken the thesis was new when the essay was written in the summer of 1913. Were a reader to discover that the thesis had been stated prior to that date I should be grateful if he would kindly inform me where such statement may be found.

As indicated in foot-notes six of the thirty-one articles in the volume have been printed elsewhere. For permission to reprint them I desire to thank the editors and publishers concerned.

I venture to repeat here the closing words of the preface to the second edition of my *Human Worth of Rigorous Thinking:*

"It occasionally happens that a reader writes to an author asking for further light or offering criticism and sometimes a word of praise or blame. Experience has taught me to value such communications as sometimes leading to helpful correspondence and not infrequently to the discovery of spiritual comradeship."

CASSIUS J. KEYSER

September 1, 1926

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Mole Philosophy
&
Other Essays

MOLE PHILOSOPHY

SOME YEARS AGO it was reported in the morning newspapers that a certain rich man had offered an up-state city of New York a large sum of money for the purpose of establishing a public library provided the people of the city would furnish an equal sum for the purpose and that the offer had been declined, the spokesmen for the city saying: when our people decide to have a community library, they will establish one and pay for it themselves.

On that morning I had occasion to call on the venerable and venerated Dean of Columbia College, John Howard Van Amringe, head of the Department of Mathematics in Columbia University and the most beloved man ever connected with that institution. At once the Dean drew my attention to the report and, laughing, said with much emphasis:

"I like the spirit of those people. They

don't want to be saved by some one else. When they decide to have a library, they will pay for it themselves."

He added:

"You know, Keyser, there are two kinds of ambition in this world—a kind that can be realized and a kind that can not. Old Mr. So-and-So (referring to the would-be donor), when he was young, had the kind of ambition that can be realized; he realized it; and now he wishes to be blest."

So, too, with ideals. Ideals are of two sorts —those that can be realized and those that can not. The former are spurious; the latter, genuine. Genuine ideals are unattainable—they are ever-flying perfects, as Emerson said.

There is a flourishing school of philosophy in which it is held that such ideals, because they are unattainable, tend to beget despair, to depress, to dishearten, to devitalize, to mock legitimate aspiration and defeat the ends of life. The opposite is true. Genuine ideals are beautiful—the supreme ones ineffably beautiful—and beauty is life's elixir, its chief stimulant. Beauty is the generative principle of what is good in the world.

Unattainable ideals have made possible the great triumphs of the human soul. But for the unattainable ideal of perfect justice, we should not have the Republic of Plato. But for the unattainable ideal of logical perfection, we should be without the miracles of modern Mathematics. But for the unattainable ideal of perfect conquest of Nature, we should not have the marvels of modern Invention and Empirical Science. But for the unattainable ideal of perfect drama, we should not have the works of Shakespere or those of the Greek masters. And so on and on.

Beautiful indeed are the sun and moon and stars, and they give precious light, but the light they give is external. The inner light—the radiance that lures to excellence and illuminates the endless way to perfection—is the light of ideals—of ideals that are unattainable.

There are interesting creatures known as moles. Their eyes are very small and they have but little vision. One variety of these humble animals has a distinguished name—it is the star-nosed mole. In the minute anatomy of its nose there have been found as many

as 30,000 receptors. These no doubt serve it well in its hard struggle for existence, unvisited by utopian dreams but dealing always and only, in practician manner, with such concrete realities as are present to its sense. Its life is, however, a mole's life, dark, subterranean —no "angel of progress, leaning from the far horizon, beckons" it onward to ever better and better things.

Human beings, too, have receptors and they have eyes, too, better than a mole's. But above all they have the power of *Idealization* giving them dreams and visions of goods beyond the attainable. It is this power that makes humans human; it is this that quickens them to higher life and sustains the toil that creates civilization. Pursuit of the unattainable is the proper vocation of man.

So the philosophy that counsels us to eschew genuine ideals on the alleged ground that, being unattainable, they weaken the springs of life and produce despair, is profoundly ignorant of human nature. As a philosophy of human conduct it is mean. It is at best the philosophy of the star-nosed mole. Its ethical principle resembles that of a beetle—buzz,

fight and hit where you can—only, a beetle has wings and can fly a little but that philosophy is wingless—it crawls.

It has been truly said that the style is the man. In this connection it is significant that the philosophy in question is formless. It is so inevitably. For where genuine ideals are condemned as vicious, art is impossible.

RIGHTEOUS INTEMPERANCE

THERE are many profound Prohibitionists, I am told. Whether the specimen presented below is fairly representative readers will judge for themselves. I had the fortune to encounter him one day some years ago in the dining-room of the Rocking Stone restaurant in the Zoological Garden of the Bronx, where my wife and I were having lunch. He entered the room, accompanied by four women. As the five approached near where we were sitting, we guessed the man to be a bachelor of about forty years, perhaps a shrewd politician, more probably a prosperous clergyman, certainly a righteous persuader of some sort, a winner of good causes, a moral victor. The women were not too young—they had not the bloom of silly years; nor very old, spinsters perhaps but not much faded and certainly not resigned. His relation to the party was evidently that of hero, escort, and guest. Having seated themselves at a table adjacent to ours and having

given the waiter their order, they began conversing in tones so distinct that we were quite unable to avoid hearing what they said.

"What you were telling us, Mr. Spyer, out there under the tree about Prohibition, what a grand thing it is and how hard you and Mr. Bryan and all the other good people had to work to put it through, was most fascinating," said one of the women and added, "won't you please go on, Mr. Spyer? I'm sure we should all love to hear you." "We should indeed," said a second and a third. "Unless Mr. Spyer is tired, poor man," put in the fourth. "He has told us so much that maybe he would like a little rest."

"Oh, no, my dear ladies, I am not tired. How could I get tired talking of such a subject to such an audience?"

"Thank you," said a chorus of four voices, "please go on, then." And the hero went on.

"As I said in the shade of yonder tree, the Prohibition Amendment and the Volstead Act are the grandest moral achievements in the history of the world. The Eighteenth Amendment is the best part of the Constitution. It is worth more than all the rest of the docu-

ment. Certain fools are wicked enough to say the amendment ought to be repealed. I say it would be better to repeal all the rest of the Constitution and keep the amendment for we must not forget that the rest of the Constitution was drawn and adopted by wine bibbers and might easily be improved. Anyhow the amendment is alone good enough for the fundamental law of any land. Liquor drinkers say we are crazy zealots and will next want to put God in the Constitution. I tell them that God is already in the Constitution. For the Eighteenth Amendment is pure righteousness and where pure righteousness is, there God is also."

Here the speaker paused as if to let that last thought sink in, whereupon one of the women said with evident admiration: "I understand now, Mr. Spyer, what people said about your campaign speeches when the fight was on, how wonderful they were, how you swayed your audiences—they said you were like Mr. Bryan."

"To be likened to Mr. Bryan," said Spyer, "is the very highest of compliments, but I do not claim to deserve it. No one can speak like

Mr. Bryan—he is incomparable. Do you know why he never became President? The Republicans did not defeat him. He was defeated by Divine Providence because Divine Providence wished to reserve him for a far greater office—the office of Moral Teacher of the world. Did you never hear him? No? I have heard him often. As an embodiment of moral and religious energy he is unmatched among men. I shall never forget the great speech I heard him make on the Pacific coast."

"Do tell us about it, Mr. Spyer, please."

"I will with pleasure. It was in a large church in San Diego. The auditorium was packed, standing room and all. The subject was Preparedness, for it was shortly after we entered the World War. For five minutes or so Mr. Bryan spoke in an ordinary way about the importance of small economies, such as plowing up the back yard or even the front lawn to raise potatoes, corn, etc. Then he entered upon his speech proper, which dealt with what the great orator called moral preparedness. It was the greatest performance I ever witnessed, a truly wonderful message, a

marvelous mosaic of moral splendors—political wisdom, social wisdom, religious wisdom, ethical wisdom, economic wisdom—all presented with irresistible force and charm. There were many climaxes. I wish you could have seen the peak of them all. We knew that something was coming but we knew not what. Suddenly Mr. Bryan paused, straightened himself up till he looked like a god, raised his right arm as if in benediction or warning and then, as we waited, said swiftly as rifle shots—'I don't drink wine, I don't like it, I like radishes and I eat 'em'—and smacked his lips.

"It is impossible to describe the tremendous effect of those magic words and that magic smack—the building trembled with the applause they evoked from that vast audience of sober, intelligent Christian men and women. Why, one excellent lady told me afterward that when she went up to thank Mr. Bryan at the close of his lecture she felt like expressing her gratitude by kissing him and asked me whether I thought it would have been wrong for her to do so."

"And what did you answer her, Mr. Spyer?" asked the lady at his right.

"Not wrong, I said, but imprudent. I told her it would have been permissible in private but not in public, not in a church or a restaurant. It is not enough, I said, for the righteous to be righteous; they must be circumspect —they must protect themselves from the unrighteous gossip of the wicked.

"But to return to Mr. Bryan. He and other orators helped mightily, but the final triumph of Prohibition was not due to oratory alone. Very far from it. There was the long period of preparation when noble men and women worked and prayed and spied and preached and taught to save a village or a state. Local movements here, there and yonder learned the art of co-operating with one another. The result was a national movement. Righteous sentiment grew rapidly. But a great work remained to be done. It was necessary to educate the Congress and the State Legislatures. I began as a preacher. Then I lectured and wrote for the Cause. But, like many others, I did my best service as a promoter and educator. I mean that I helped to promote the education of politicians. And how did we educate them? We did it by Fear. If you want a

politician to do right, don't waste time trying to reason with him—scare him. That is the way we operated all over the country. If a man became a candidate for an important legislative office, we promptly demanded that he give us a public pledge to talk 'dry' and vote 'dry.' If he gave the pledge, we supported him and he was apt to be elected. If he declined to pledge himself, we fought him hard and he was apt to be defeated. Pledge givers were watched both before and after election, and it quickly became known that pledge breakers were pursued with double vengeance. I tell you, my dear friends, that Fear is the greatest of educators. In a short time it taught state and national politicians the most salutary of all lessons—that it pays to be righteous. And as soon as that lesson was learned, the glorious victory was won, the grandest moral triumph in all the history of the world."

"Nothing," said one of the women, "could be grander and it is oh so inspiring to hear you tell about it, Mr. Spyer." "I feel the same way," a second one said, "it is such an honor to have you with us, I don't know how to

thank you enough." "It has indeed been perfectly adorable," said a third one. "I was just thinking, Mr. Spyer, that, if there were enough men like you, this world would be a paradise," the fourth one said.

The hero had no immediate opportunity to acknowledge these compliments suitably, for while they were being paid him, my wife and I, having finished our luncheon, rose to go and, just as the fourth woman ended her speech, I stepped to their table and, addressing the man, said:

"May I interrupt you for a moment?"

"Certainly," he said.

I continued: "My wife and I have been sitting so near you and you have spoken so distinctly that we were quite unable to avoid hearing what you have said. Not that we wished to avoid it for we have been much interested in your narrative and your sentiments. On this account it occurred to me that I should like to ask you a question if you will allow me to do so."

"Please do," he said, "pray be seated."

We sat down.

"Now," said he, "what is your question?"

"The question," I said, "is this: Have you considered whether, if people are to learn to use freedom, they must be given some opportunity to abuse it?"

Looking a bit puzzled, he replied:

"I'm afraid I don't get you."

"It is my fault," I said, "for I put the question very awkwardly. Allow me a preliminary word and then my question will be clearer."

"Please go on," he said.

"Do you regard freedom," I asked him, "as an excellent thing for men and women if they do not abuse it?"

"I do," he replied, "there is nothing better if it be used and not abused."

"Is freedom," I asked, "something that people just naturally, or instinctively, know how to use or must they *learn* to use it?"

"Certainly," he answered, "freedom is something that people must *learn* to use for else they are sure to abuse it."

"What I wanted to ask you," I said, "is this: have you ever considered the question whether, if people are to learn to use freedom, they must be given some opportunity to abuse it?"

"No," he said quite candidly, "I believe I have never considered that question."

"Thank you," I said, "for your kindness and frankness. When I heard your conversation a little while ago, I was a bit puzzled to understand how you could be so confident, but now I begin to understand."

Upon my then rising to leave, he requested us to sit a while longer, saying he would like to ask a question or two. I said I should be very glad to hear his questions, and we sat down.

"You asked me," said he, "whether I had considered a certain question and I said I had not. But, as you are now aware, I *have* considered Prohibition and worked hard to bring it about. There is nothing else so glorious in the annals of righteousness. May I ask you whether you have considered Prohibition? If you have, what do you think of it? I hope you are for it as I am."

"It may be," I replied, "that I am not more for it than you are but I suspect I am for more of it than you are; for it seems to me that you and others who call themselves prohibitionists do not realize what a panacea prohibition

really is, or would be, if rightly prescribed and administered. Of course I have considered prohibition—every one, whether righteous or wicked, must do so these days—and I will gladly tell you what I think of it if I may speak quite freely."

"Please do so," he said, "I am very much interested."

"Very well, then, what I think is as follows. You saw—*all* of the righteous people in the country saw—that intemperance—the excessive use of alcoholic beverages—was a terrible curse. You righteously decided to wipe it out. How did you do it? You did it by prohibition. What did your wicked neighbors say? They said you were fighting intemperance with intemperance, for prohibition, they said, is manifestly a form of intemperance. Well, for once the wicked were right. Prohibition is not temperance, it is intemperance—an extreme and violent form of intemperance. But that does not show that you were wrong, it shows the contrary, for it is precisely the intemperateness of prohibition that makes it so efficacious. In the domain of moral medicine I am a thorough-going Homoeopathist. *Similia simi-*

libus curantur is my creed—like is cured by like—intemperance by intemperance.

"I am a believer in general principles and here we have a general principle of tremendous sweep. You ought to know that there are two kinds of intemperance—the righteous kind and the wicked kind. Prohibition is righteous intemperance, extreme and violent, as I have said, but righteous. Wicked intemperance is the curse of the world. It is not a symptom, it is a terrible disease, of which there are divers kinds. Drunkenness is one of them, but there are many others just as bad or even worse. The great principle is: Extirpate *all* the gross forms of wicked intemperance by the one form of righteous intemperance—Prohibition. The fault I find in you, if I may say so, and in your fellow prohibitionists, is that you have applied the great principle to one particular form of wicked intemperance —drunkenness, I mean—without clearly perceiving that you were using a principle, certainly without realizing that you were wielding the one principle by which the righteous few can save a wicked world. You have had more zeal than imagination. You have been

merely toying, blindly toying, with an engine of infinite power for regenerating mankind.

"If you are to save the world you must have, not less zeal, but more imagination—imagination enough to conceive your task in its true proportions, which are really sublime. The first thing to do is to assemble the righteous and organize them. But who are they? That is easy. The righteous are those who know they are righteous. Righteous men and women know that they are righteous and, what is just as important, they know that people who do not agree with them are wicked. It is not enough to think you are righteous, you must know it. The wicked sometimes think they are righteous but that is because they are blinded by their wickedness. And so the righteous must pick themselves out; every righteous man must pick himself; every righteous woman must pick herself; and, of course, they will be willing to pick one another if ever it becomes necessary to do so, which it never will.

"This task of selection, which is already pretty far advanced, can be quickly finished for the pickers are perfect and each of them

has to pick but one—himself or herself. Having been picked they must be assembled in groups and taught. The work of teaching them is a job for veterans like you. Its importance cannot be exaggerated. One lesson you can teach easily. I mean the lesson that it is the right and the duty of the righteous to rule. You may find that you and your fellow prohibitionists are in a minority for the wicked are very numerous. But that will not discourage you. You know and you must teach that your right to rule is not derived from your numbers but from your virtue. You are to rule the wicked by *divine* right—the right of righteousness. For the very essence of righteousness consists in compelling the wicked to do what the righteous want them to do.

"Because it takes more brains to understand it you will find it harder to teach your fellow prohibitionists the great general principle which I have already mentioned. I mean the Homoeopathic Principle of Moral Medicine. But you must somehow contrive to teach it to them. Before they can do their work intelligently and effectively they *must* be made to understand that the panacea for all forms of

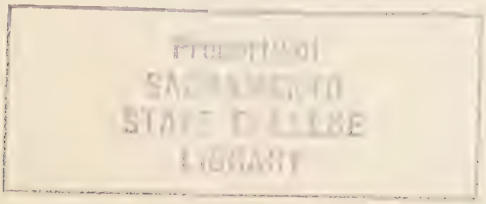
wicked intemperance is righteous intemperance—the intemperance of Prohibition administered promptly and in large doses.

"As soon as they have grasped the general principle they will be prepared to see, and you will show them, that in establishing the Eighteenth Amendment and the Volstead Act they were wiser than they knew for they were applying a great *principle* without being aware of the fact. And how astonished and humiliated they will be when you show them that at the same time, owing to their blindness, they neglected most of their duty, for you will say to them: just think; roundabout us are many gross varieties of wicked intemperance, some of them even worse than the alcoholic variety; we had a remedy for *all* of them; yet we applied it to only one of them and that not the worst; we have been almost vain of our achievement; why, our righteous work has hardly begun; we ought to be ashamed of ourselves.

"In teaching your fellow zealots about the other gross varieties of wicked intemperance and how to deal with them you will need to be systematic, clear and specific. You *could*

show that such varieties exist even if you had not seen them. For you could show it *a priori* by reasoning as follows: Here, for example, is something that nearly everybody likes to do; most people are wicked; hence most people will do that thing too much, they will abuse it; a case of wicked intemperance, calling for prohibition. But you need not depend on any thing so pale as *a priori* reasoning when the concrete hectic facts are about you on every hand.

"Consider eating, for example. Almost all people like to eat. Most people eat too much. Hence we have Gluttony, one of the commonest and grossest forms of wicked intemperance. Its evils are too numerous to mention, too great to measure. I shall not describe them to you. I cannot refrain, however, from pointing out here how one kind of wicked intemperance promotes every other. The glutton eats too much; his health gives way; he gets weary, languid; he craves a stimulant; hence the bootlegger prospers. All forms of wicked intemperance are parts of one immense disease. To cure one form, you must cure all of them. To put an end to the evils of Gluttony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you may ultimately have to prohibit the production, sale, purchase, and consumption of foodstuffs of every kind. You will probably make that a last resort for, of course, it would result in some personal inconvenience and might even impair your efficiency as a benefactor, for even the righteous occasionally have to eat. There are, you know, many kinds of Gluttony. It will be best to begin with one of the worst kinds, say that of beef-eating. You should know and teach your colleagues how enormous, insidious, and widespread the evils of it are—far worse than alcoholic intemperance. Just think of it: acidosis, stomachic ulcers, intestinal ulcers, kidney trouble, Bright's disease, arteriosclerosis, rheumatism, neuritis, insanity, and so on. In this case your duty is unmistakable—down with Beef! Up with Prohibition! I am, of course, aware that some righteous people like beef and occasionally eat a little of it. But it isn't necessary for them. The Hindus have taught us that. Many of them eat no meat of any kind. Yet a few of them, even of those who have not become Christians, live righteous lives, owing no doubt to some *indirect* influence of Christian

missionaries. You thus see that beef-eating is not essential to righteousness. You will probably find it necessary to prohibit everything that is not essential to righteousness. That would be good for education. Our secular schools, colleges and universities teach the young every sort of thing except how to be good. The wicked impudence of scientific men so-called! They don't desire to be *good;* all they want is to *know.* They are trying to become omniscient. God is omniscient. You know that that is enough. No wonder those scientific fellows are getting so they can't understand one another—their language is jargon—God is rebuking their presumption by confounding their speech.

"Another gross form of wicked intemperance consists in the abuse of tobacco. God produced this plant, but He did so for the benefit of the tobacco worm. Wicked men and women, too, kill those beautiful creatures and take their God-given plants for themselves. The money worse than squandered in one day for tobacco is enough to support for a month all the hospitals in the world. The basest thing that happened in the World-War was the send-

ing of tobacco to our boys in the trenches. All honor to the pious women who tried to prevent it. You must not fail to prohibit the production, sale, purchase and consumption of tobacco. It will make you happy to do it and none but the righteous have a right to be happy.

"And there is the abuse of dress. Consider the infinite wealth and time and energy spent especially by women trying to make themselves physically attractive. It is a terrible evil, a vile form of intemperance. You are, of course, aware that clothes are not essential to righteousness. If you decide to prohibit the use, in order to end the abuse, of clothes, I hope you will confine the prohibition to the Southern States and California, except in Summer when it might be extended to cover the entire country. But at the very least you must prohibit the wearing by women of such extravagant finery as excites the evil passions of men and keeps other women in a constant state of envy.

"The gross varieties of wicked intemperance are too numerous for me to enumerate them all even if it were desirable for me to

do so, which it is not, for, now that you have the clew, you will delight in the duty of following it wherever it leads. I will close with a word about the grossest of all the varieties.

"What I refer to is over-indulgence of mate-hunger, the abuse of sex. Only the other day a very eminent physician, of long and wide experience and observation, told me that in his opinion this form of intemperance produced more misery in the world than all other causes together. You will certainly find that the only remedy is the great panacea—Prohibition. It need not result in the extinction of the race. You are, I believe, a fundamentalist. Being such you know that the greatest man of history was born of a virgin. That is perhaps a greater miracle than converting water into wine. God is omnipotent. But even if it did result in race extinction, it is perhaps better that no child should be born than that millions be born of syphilitic parents. Even as it is, all that are born have to die, and every death is tragic. Think of the infinite amount of tragedy that would be prevented if our race were to become extinct. Moreover, you know that when a child is begotten, its soul is

not begotten; the body is begotten and in some mysterious way the soul enters afterward. And you know that not many souls are happy in their tenements of clay. How could they be, thus housed? Where were they before? In some realm of bliss, perhaps. Why not let them alone?

"I am sorry to have detained you so long."

"Thank you," he said, "I see that you have thought of prohibition more than even I have, and I shall consider what you have said. I take it that you are a teacher. May I ask you your name?"

"My name," I said, "is Rufus Rector. Yes, I am a teacher. I am Professor of Righteousness in the University of Podunk."

"Podunk? Podunk? Oh yes," he said, "it is, it is over in . . . yes, I've heard of it but I didn't know there was a university there."

"There isn't," I replied, "it only exists in my imagination—I am a 'wishful' thinker."

AN EDUCATIONAL TEST

MANY college graduates—perhaps a majority of them—are not educated.

What is the test?

There is no criterion that may be rightly called *the* test, for there are many tests.

Though the tests are many, I will here state but one of them. In a sense it is a negative test but it has the double merit of being at once infallible and convenient. It is convenient because any one can apply it readily either to himself or to others.

The test in question is this:

Do you read books that you cannot understand easily? Books that require to be read slowly and deliberately? Books that you know are beyond your capacity to understand fully? If you do not, you are not educated; you have not the temper and habit of an educated mind; you are not a student.

Do people who fail to meet that test *think* that they are educated? No. Such people do not think.

CONVICTIONS & STATES OF MIND

In a great majority of cases when a man or a woman says "I think so and so" or "I believe so and so" or "my opinion is such and such" or "I assert such and such a proposition," that man or woman, I say in a great majority of cases, is not expressing a conviction but only a state of mind. There is a very great difference between a state of mind and a conviction. Everybody has states of mind but not many people have convictions. Those who have convictions have only a few of them, and the reason is plain—convictions are hard to win.

States of mind are for the most part induced in us by the sentiments and faiths of the household, the neighborhood, and the family newspaper. We derive our states of mind from the social atmosphere by a kind of cerebral suction. But a conviction is a result of

hard, patient, and honest thinking—the rarest activity of man. Honest thinking is attended by serious doubt. "In experimental science," wrote Louis Pasteur, "it is always a mistake not to doubt when facts do not compel you to affirm." It is not less so in mathematics, in philosophy, in economics, in ethics, in politics. One cannot rightfully say "I am convinced that such and such a proposition is true," unless one has successfully endeavored to doubt its truth, and has, by honest consideration of all the objections that one has been able to think of, finally come to the conclusion that the proposition is indeed true.

Does such thinking upon a given matter always lead to conviction? It does not. It is always a necessary condition, as mathematicians say, but it is not always sufficient; the outcome of it may be uncertainty, deliberate suspension of judgment, candid avowal that after all one does not know. Uncertainty thus arrived at is not a mere "state of mind"; it is indeed a kind of conviction, rare and admirable, but not the kind that was sought—it belongs to a different type.

Is every one qualified to win convictions?

Yes and no. In trivial day-to-day practical affairs, like ascertaining the number of cattle in yonder field or the price of admission to a "movie" or the price of stocks and bonds, all are qualified, save idiots and imbeciles. For the winning of convictions in great and difficult questions of ethics and religion and philosophy and logic and science and government, but few are qualified. Often, no doubt, the defect is a defect of native endowment—for the moron abounds; but, in a measure far larger than is commonly supposed, it is a defect of education. Why do I think so? Because education is mainly controlled and administered by incompetents; by men and women who, because they have never *earned* a grave conviction, have none but are not aware of it; by mere opinion-bearers, who have never been quickened by the pure *spirit* of knowledge but are not aware of their estate.

Only a few years ago that great man of science, Helmholz, physicist and mathematician, went so far as to say that only those who have worked on the "confines of knowledge" know "how conviction is won and how not."

None but those who have won a genuine conviction regarding some great matter knows what such a conviction is and how vastly it differs from the mere states of mind of the motley multitude. Do *you* know? If not, do you know *that?*

LOUIS PASTEUR AND PROHIBITION

WHEN Louis Pasteur, son of a humble tanner, was a young student in the École Normale, far from home, in the "wicked" city of Paris, he received the following letter from his father:

"Tell Chappuis"—Chappuis, a student of philosophy, and young Pasteur were chums—"Tell Chappuis that I have bottled some 1834 bought on purpose to drink the health of the École Normale during the next holidays. There is more wit in those 100 litres than in all the books on philosophy in the world; . . . Mind you tell him we shall drink the first bottle with him. Remain two good friends."

After the great man died at the age of more than three score years and ten, William Osler, Regius Professor of Medicine in the University of Oxford, wrote of him:

"He was the most perfect man who has ever entered the Kingdom of Science."

Pasteur said of his father:

"For thirty years I have been his constant care, I owe everything to him."

If, in addition to his great native gifts, Louis Pasteur had had the precious fortune to be the son of an ardent prohibitionist, or to have been educated by one, he might have been able to render as great service to humanity as William Jennings Bryan or even William H. Anderson.

THE LOGIC OF PIOUS SAVAGERY

DR. NICHOLAS MURRAY BUTLER'S address entitled *Prohibition Is Now a Moral Issue* was delivered at the annual dinner of the Missouri Society at the Hotel Plaza, New York, April 29, 1924.

A few days thereafter a resolute man, noted for his piety and worldly prosperity, came to me and said with much feeling:

"Have you seen Dr. Butler's speech on prohibition?"

"Yes," I replied, "I have read it attentively."

"Well, *I* didn't," said he, "I wouldn't read such stuff."

"Why not?" I asked.

"Because," he said, "that man has gone over to the liquor interests."

"If you had read the address," I replied, "you would know that Dr. Butler has no more gone over to the liquor interests than you have or I."

"Well, nine-tenths of the people," said he, "will *think* he has and the effect will be just as bad."

"Then your nine-tenths of the people," I said, "ought to be *whipped* into attention."

"I want to say to you," he rejoined, "that, if I were a trustee of Columbia University, I would kick that man out of the presidency of that institution."

"That," I replied, "would be a very uncivilized way to answer an argument—the way of intolerance and force—the logic of pious savagery."

PORTRAITS OF BOOK-REVIEWERS DRAWN BY THEMSELVES

A JUST review is a difficult, rare, and highly praiseworthy achievement.

Readers of a serious book-review may rightfully expect to find in it two portraits, one of the book and one of the reviewer. A reviewer may fail to portray the book but he cannot fail to portray himself—he is pictured by his performance.

If he portrays the book, he thereby portrays himself as having intellectual and scholarly competence and an imperious sense of honor including loyalty to the author, loyalty to the editor, loyalty to the public, and loyalty to truth. His picture is that of a worthy citizen of the commonwealth of science and letters.

If he fails to portray the book, he thereby portrays himself as one lacking intellectual or scholarly or moral competence or two of these or all three of them. All such portraits are

spiritually ugly. Of all of them the ugliest is perhaps that of a reviewer who uses the book merely or mainly as a trapeze upon which to mount and display himself. It is the picture of one who is vain, deceitful, and cowardly—intellectually a knave, morally a fool.

A periodical *Review of Book-Reviews* could render a very great and precious service. Its chief function would be, on the one hand, to signalize and commend competent reviews and reviewers, and, on the other, to signalize and denounce incompetent reviews and the nasty little scoundrels who perpetrate them.

HARD TO ASK QUESTIONS

It is often said that a fool can ask questions which a wise man cannot answer. It is better to say that a wise man can answer questions which a fool can not ask. For it is not easy to ask questions. Frequently it is harder than to answer them. It has often required a century or a hundred thousand years to ask a question which a day or a decade has sufficed to answer. After 500,000 years of human existence a question will be asked tomorrow for the first time and be answered the next day or the next.

Curiosity, the question-asker, is slow. It is not only slow; it is feeble, faltering, blundering, easily deceived. Some innocent people sometimes try to show their profundity by trying to ask unanswerable questions. They always succeed in showing it—to those who know that there can be no such thing as an unanswerable question. Questions do not fall

into two classes, the answerable and the unanswerable. All questions are answerable. To speak of an unanswerable question is like speaking of a footless tripod or a round square —a contradiction in terms. Every possible question belongs either to the class of those that have been answered or to the class of those that have not been answered yet but can be—*ignoramus* we admit, of course, but not *ignorabimus*.

Not everything having the form of a question is a question. It is easy to write something that looks like a question or to make a noise that sounds like a question but is not one A fool can do it; so can a wise man; and they do it often, both of them, without intending to do it. They are deceived by the interrogatory form of a combination of words. A word combination having the form of a question without being one may be called a pseudo-question for the want of a better name. Pseudo-questions abound on every hand—they are perhaps more numerous than questions. Who made the world? Who made the maker of the world? Which is more identical, the true or the beautiful? When did time begin and when will it

end? Where are the outer walls of space? How did being originate? What is the very essence of electricity? Why is a circle round? Why does the sun attract the earth? Why do the opposite sexes attract one another? Why do oxygen and hydrogen combine to form water? Why are things as they are? Why do events happen as they do? Why is there anything at all? Those are a few random specimens of pseudo-questions. Many what-'questions,' the great majority of why-'questions,' most 'questions' respecting essences and origins, and numerous others, are pseudo-questions.

Sometimes it is easy and sometimes very difficult to distinguish between questions and pseudo-questions. What happens when an irresistible force strikes an immovable body? In what respects would you differ from yourself if your father had been another man and your mother another woman? It is immediately obvious that those are pseudo-questions. But consider this: How can one square the circle by ruler and compasses? It is a pseudo-question, but the fact that it is such was discovered only the other day after geometri-

cians, supposing it to be a question, had tried for many centuries to answer it. Which is larger, the number 1 or the number i (where i means $\sqrt{-1}$)? It is not as plain as a pike staff that that is a pseudo-question, yet it is one, for the two numbers are neither equal nor unequal; they are incommensurable or, better, they are incomparable in respect of magnitude. What was the first cause? What will the last effect be? Is God the Son as old as God the Father?

If it were easy to tell whether a seeming question is a question or a pseudo-question, the world would have been spared an immeasurable amount of mythologizing, theologizing and philosophizing as well as many persecutions and wars. The course of human time has been long. Think of the untold billions of simple-minded men and women who, though troubled by the riddles of the world, were yet unequal to the difficult task of framing questions about it and found their sole philosophy in mythological responses to pseudo-questions. Think of the immense library of books written by sages trying to answer pseudo-questions, which they mistook

not only for questions but for great questions. Think of all the means employed, savage and civilized, brutal and humane—the measureless wealth, the fear and force, imprisonment, torture, burnings at the stake, national and international butchery—in order to make the world accept for truth the "answers" found by a few well-meaning but deluded men for certain "questions" now known to be, not questions at all, but pseudo-questions, admitting of no answer whatever whether by men or demons or gods.

Does the present differ from the past in that respect? Not essentially, I believe. The other day a distinguished Hindu philosopher said to me: "Permit me to ask you a question." And then he said: "What is the relation of the personal pronoun I to Consciousness?"

Is that a question? Presumably the philosopher regarded the pronoun I as denoting something and the term Consciousness as denoting something and would have said that his "question" is equivalent to this: "What is the relation of that which the personal pronoun I denotes to that which the term Consciousness denotes?" But does the pronoun I

denote something or somethings—many different things? The latter, it seems, for the philosopher, being a Hindu, may say: "I think it wrong to eat meat." And John Bull will reply: "I don't." Certainly the two I's do not denote the same thing. So the "question" now stands: "What is the relation of the many things which the pronoun I denotes to that which Consciousness denotes?" Of course one may wonder whether the pronoun I really denotes. But let that query pass. We must ask, however, whether there is something which the word Consciousness denotes, for, if there is not, that fact would itself show that the "question" is a pseudo-question. I am certain that I am sometimes conscious and I believe that you are so, too. But from the fact that there are conscious beings in the world it does not follow that the world contains an object called Consciousness, just as from the fact that there are sweet things in the world it can not be inferred that there is such a thing as "cosmic saccharinity." Again, our philosopher speaks of "*the* relation" as if there were but one. There may be none but, if there be one, it is very probable that there

are many. I will not pursue the matter further. Verily it is not easy to ask questions.

As to whether Consciousness denotes something, I will add: If people would stop objectifying abstractions, which they probably never will, or if they would stop objectifying abstractions *unconsciously,* which they might learn to do, at least half the pseudo-questions, befuddling the world today as they have befuddled it from time immemorial, would vanish, and that would be a very, very great gain.

THE SIGNIFICANCE OF DEATH[1]

[*The following address deals neither explicitly nor implicitly with the question of immortality. It neither asks, nor tries to answer, the question: If a man die shall he live again? It is concerned solely and exclusively with the relation of human death to the life that* PRECEDES *it. And so the address can not profit any one whose interest in the great question of immortality is such as to render him incapable of meditating upon the deep relation in question.*]

IN commemoration of those who in surpassing measure gave their lives to the service of reason, it seems fitting to devote this brief half-hour to a consideration of the question: In a reasonable view, what is the spiritual significance of death?

The question is so vast that time would fail me, even if competence did not, to bring the matter with all its bearings into the full light of day, and we shall have to be content with the twilight or the dawn.

[1] Address delivered at the Commemoration Service held in St. Paul's Chapel, Columbia University, December 7, 1913. Subsequently printed in *The Columbia University Quarterly* and *The Hibbert Journal.*

At the outset we have to own that in the literature of the subject, despite its eloquence, its pathos and its wisdom, there is found but little to further our enterprise, for in that immense literature reason has played an obscure and subordinate rôle. Now and then, in the long course of time, and more or less distinctly, her voice has indeed been heard, as in the beautiful words of Plato, in the brave words of Lucretius, in the consoling words of Paul; but, in the main, the literature of death is a literature of grief and dread, of morbid fancies, and wayward speculation; and, sadly enough, in the feeling and imagination of a great majority of our fellow men and women, death remains in the primeval tangle of mystery and fear and demons and dreams. After the long lapse of ages, it still is true that

"Imagination's fool, and error's wretch,
Man makes a death which nature never made:
Then on the point of his own fancy falls,
And feels a thousand deaths, in fearing one."

In trying to approach the subject in a rational frame of mind I am sustained by no faith in the omnipotence of reason. I am sustained by no belief that reason is competent or

destined to extend the dominion of its light throughout the whole sphere of our experience and psychic life. Of this sphere, it is clear enough that the field of what is rational, the great domain of reason, is not indeed the whole, but is only a grand division; for in the domain of reason are found many phenomena that seem to intimate more than dimly the existence of zones above and beyond its borders. Within its own sphere, however, the aim, the sacred obligation, the high and holy office, of reason is to see things as they are. Therein is the hope that sustains our present meditation. For reason there is no way of conquest except the way of illumination, and over death it seeks no victory save that which may come through understanding. Hope of other victory there is none. And so we ask: In the light of reason, what is the spiritual significance of death?

Unless I am mistaken the answer to the great question will ultimately be found where, strangely enough, it has least been sought: namely in the relations of our life to the familiar fact of its termination. It may be, as millions of souls have fondly hoped, that

death is the portal of an eternal life elysian. We do not know. It may be, as other millions have dared believe, that death is a station of transfer in a long and winding course of transmigration destined to issue at length in a blest state of everlasting extinction. We do not know. We do know that death is not the penalty or the effect of an ancient disobedience. We know that it is not a monster to be feared, or a god to be placated, or an eternal and dreamless sleep, for sleep is a state and a function of life. What death is, if we may trust its plainest aspect, is very simple: it is the end of life, a death is the end of a life. By life I do not mean a thing of conceptual fabrication. I do not mean a static abstraction composed of a few beatitudes detached by thought from reality, formed into a kind of strand and then drawn out to stretch, colorless and cold and thin as an ether thread, throughout the eons of endless time to come. Neither do I mean a life form or principle that may transcend all temporal vicissitudes, including births and deaths. I narrow the problem: I mean this temporal life, which no one denies or doubts. I mean the life that we know, the great con-

crete and throbbing life that we know by living it here now in the body upon the earth. How immense it is! How immeasurable and manifold and inexhaustible its riches!

There are moments when it seems but a little thing. There are moments when our sense of reality is dim, when recollection has relaxed its hold, and our vision of life, the spell of its morning and the glory of its noontime gone, contracts and fades in the gloaming of its even-tide. In such a mood we love to liken life to

"A Moment's Halt—a momentary taste
Of Being from the Well amid the Waste."

In such a mood we like to fancy that we are such stuff as dreams are made on and it is soothing to say our little life is rounded with a sleep. In these melancholy moments it is sweet to hear it said that "life is only an episode between two eternities of death"; that man, born of woman, is of few days and full of trouble, that he fleeth as a shadow and continueth not; that "Life is a narrow vale between the cold and barren peaks of two eternities"; that it is only "a short, shadowy and winding road on

which we travel a little while, from the cradle with its lullaby of love to the quiet wayside inn where all at last must sleep." There are moments, I admit, when our hearts cry out: Vanity of vanities, all is vanity. For, like a great spirit, like a great man, life is great enough to be capable, when it will, of seeing itself as small. The selective instinct of the poet is in us all. We know how to confine our attention to some minor chord or melody amid the rolling billows of an orchestral harmony or to note only some lurid flash among the manifold wonders of a raging storm. Yet the artistry by which one aspect, singled out from an infinite variety, is made to fill the eye does not really deceive us. We know that our mournful moods are but momentary, as fleeting shadows or the "flowing purple" of a sea. We know that the melancholy sentiments engendered in them are only the poignant elements of a life which no poetic formulation, no single generalization, however sublime, can contain. No, the life we have is not a little thing. It is great, ineffably great, defying definition, immeasurable in its magnitude, countless in its dimensions, in wonders abounding

everywhere: all that perception can sense, all that emotion can feel, all that memory can hold of the past or prophecy foretell, all that imagination can create or reason understand, all that is without or within: the "great wide beautiful wonderful world," the glory of day, the mystery of night, the spangled heavens, the cycle of the seasons, hope and yearning and sorrow and love, the splendors of art, the voices of literature and song, the meditations of philosophy, the achievements of knowledge, visions of the infinite, dreams of immortality. Such is the Life of which the End is called Death.

Our question is: What is the significance of the End? To be significant at all is, of course, to be significant for life, for, if there were no life, there could be no significance. It is, then, plain that the meaning and worth of mortality must be sought in the nature and properties of life; it is evident that to discern and to estimate the spiritual significance of death we must ponder the relations of life to the simple fact of its termination; we must ask what life would be if death were not. We are not practised in such reflection. In our everyday

experience, processes that continue for a time and then come to an end are so common and so familiar that the abstract principle of termination, though the world of reality is riven by it, is, for the generality of men, not impressive. Nevertheless, in connection with our present enquiry, the familiar fact that our lives are things that, sooner or later, cease to be, demands the most attentive consideration. For it means that life, notwithstanding the greatness of it, notwithstanding it is truly illimitable in many regards, yet is, in one important respect, a *finite* thing. This finiteness of life, its temporal finitude, is, for our quest, a fact of supreme importance. For, owing to a radical insight of modern science, we know at length that the distinction of finite and infinite is very profound, deep as the nature of being, cleaving the world; we know that the difference between the peculiar properties of what is finite and the peculiar properties of what is infinite is a radical difference, not to be obliterated or annulled, and fatal for thought to disregard. Unfortunately this scientific doctrine, although it reaches the very marrow of our theme, is too abstract and dif-

ficult for further development here. I have mentioned it in order to signalize its bearing as at once suggesting and supporting the thesis which I wish now to submit briefly for consideration.

The thesis, which is simple, is not remote or difficult to grasp. It is that the values of life are values characteristic of mortal life; it is that the temporal finitude of life is essential to its worth; it is that, were it not for death, if life did not end, if it were a process of infinite duration, it would be devoid of the precious things that make us yearn for its everlasting perpetuation.

To be immortal a life must be eternal—it must be a life that never was born. Birth, it is true, was often allowed in the olden time to the gods of poesy and myth, but these were not immortal. The born divinities have passed away. "Isis no longer wandering weeps searching for the dead Osiris"; Woden and Thor are now only names of days; and the summit of Olympus is but a barren mountain top. Even if immortal lives could spring from birth, we should not be obliged to credit or assume a destined extinction of the sun in

order to make it clear that Earth could not be the home of an ever-increasing race of immortal beings, for the resources of Earth are limited, and birth would have to cease. Death, then, is essential to Birth. But in saying that

"Our birth is nothing but our death begun"

the poet was profoundly mistaken. Doubtless our birth *is* death begun but it is infinitely more: it is, with death, the condition and source of holy and beatific things that characterize the life that intervenes.

Our human speech, if it were without the tender and sacred things it has from death, would ill befit a life-loving race of mortals. The precious associations that cluster about the words, friendship, love, husband, wife, father, mother, parent, child, brother and sister, youth and age, flourish and bloom only in the heart of a life that begins and ends. But it is not only in these common goods of life, not only in the humbler joys that bless us all from day to day, that the spiritual significance of mortality may be discerned. More subtly indeed but not less certainly is it manifest also in the austere felicities of the higher reason:

visions of the infinite, the swift march of time, the irrevocableness of the past, the eternality of truth, the inexorableness of cosmic law, the imperturbability of nature's gaze upon the struggles and strifes of men, the unbroken silence of destiny—all these solemn beatitudes of reason and meditation derive their poignance from the transitoriness of the life that contemplates them. Nay, whatsoever is dearest in the sphere of *outer* sense—the beautiful garment of the external world, the wondrous drama of the revolving year, alternation of day and night, of morning and even-tide, ocean's voice, and "the rhythmic sighing of the wind"; whatsoever is highest and holiest in the sphere of *inner* sense—the tenderness and piety of art, the mellowness of wisdom, the serenity and peace of renunciation, charity, mercy, and service: *all* of the sacred values that constitute life a priceless boon are subtly bred in the all-pervasive sense of its temporal finitude. Death is not the tragedy of life; it is a limitation of life, essential to its beatitudes: the tragedy is that, if it were not for death, life would be void of worth.

Just because tragedy is thus throned in the

nature of things, just because it has its seat in the very citadel of contradiction between what we would and what we may, there is possible for reasoning beings a discipline of spirit releasing from the rule of Destiny and the reign of Fate. On the one hand, no life at all; on the other, mortal life so good as to make us crave for its everlasting perpetuation: of these two options, perhaps sole alternatives of azoic time, man may win a vision of which were best and ratify in gratitude and gladness the life-creating choice of precreative Will. To the level of such approval ascends the mount of moral discipline. The summit attained, we have such freedom as the nature of reality allows.

Not all is clear but this we see:
The living die that Life may be,
  Life, the bloom of Being.
Beneath the high and stern Decree
Abideth still deep mystery,
  Deeper than mortal seeing.

Amidst the dark a golden gleam,
A truth austere, profound, supreme:
A life not under Death's decree
Were void of Human dignity.

A kindred truth in light is seen
Of meditation calm, serene:
By beauty, sorrow, joy, and thought,
By wisdom, love, and service, taught,
May mortal man the Law fulfill,
Unconstrained of Cosmic Will.

Not fools of Chance, not slaves of Fate
Are souls of men emancipate
From lust of things they cannot win
In paths of holy discipline.
Renunciation's sweet release
Is freedom blest, eternal peace.

Yearning dreams of life to be,
Dreams of immortality,
In fair esteem of spirits free
Full vindicate the Tragedy.

Death, a law of life, must indeed be fulfilled. We may fulfill it "like a quarry-slave at night, scourged to his dungeon" or "like one who wraps the drapery of his couch about him" in conscious willingness to fulfill the law and enter the darkness that so the world of being may continue to own and bless the light of Life. To none but mortals is it given *thus* to die, willingly surrendering all to perpetuate the dignity of a world.[2]

[2] If any reader of the foregoing address has encountered its central thesis elsewhere, I shall be greatly indebted to him if he will kindly inform me where it is to be found.

IN DEFENCE OF THOMAS PAINE

THEODORE ROOSEVELT had many fine traits. He would have been yet more admirable had he been incapable of doing grave injustice to the memory of Thomas Paine. In alluding to Paine as a "dirty little atheist" Roosevelt committed a three-fold offence against truth. For Paine was not dirty; he was not little; and he was not an atheist.

I have read Paine's works: *The Rights of Man, Common Sense, The Crisis,* and *The Age of Reason,* in which he says, "I believe in one God and no more." They are of course not entirely free from error, the author was human; but Paine was always thoughtful, sincere, candid and brave. And when he wrote

"The world is my country; and to do good, my religion," he wrote the truth.

Paine devoted his life to the service of humanity.

What good can come from maligning the memory of a noble man?

HONORIS CAUSA[1]

THERE is probably nothing finer in speech than the term, The Humanities; and the wealth of its meaning, immense as it now is, will grow with the growth of sympathy and understanding; for the great term ought to embrace, and is, I hope, destined to embrace, not as now only a part of the interests but all of the interests that, in the light of experience and reason, are found to be good. Devoted by its inmost nature to the service of the humanities in that all-embracing sense of the term, a great university may be rightly said to be the most humane of institutions, the steadfast ally of every worthy impulse and every noble endeavor; and its life, the life of a great university, in research, in teaching, in inspiration, in leadership and counsel, in

[1] Oration presenting to the President of Columbia University at the 1919 Commencement the following candidates for honorary degrees: Viscount Kikujiro Ishii, Major General Enoch Herbert Crowder, Reverend John Timothy Stone, Mr. Edward Page Mitchell, Mr. Maurice Francis Egan, and Mr. George Arliss.

criticism, and in the signalization and applause of merit, is, in point of principle and implication, as rich and manifold as the life of man.

If we ask what it is that animates it, sustains it, and unifies it, the answer, not far to seek, is simple: that which animates and sustains the diverse activities of a great university and serves as inner bond to unite them all into one gigantic enterprise is a species of worship—devotion, I mean, to a certain ideal, the ideal called Excellence. Not material gain, nor worldly dominion, nor authority, nor fame, but human excellence—that is at once the focus of a university's allegiance and the hope of all its labor.

Of excellence the fields are many; the forms, too, are many, but three of these, which imply all the rest, are coordinate and supreme: excellence in the creation of beauty, excellence in the discovery of truth, and excellence in that kind of activity which has for its aim to make truth and beauty regnant in the life of mankind.

It is true now, as it was of old and ever will be, that excellence has its habitation in the

highlands—it dwells high up among the rocks. Pursuit of it is open to all; attainment of it demands two things: creative talent and assiduous toil. The former, when it comes, comes only as a native gift—a man or a woman has it or has it not; but toil is a creature of incentives and rewards.

Great achievements, deeds that are genuinely great, whether wrought in the quietude of the cloister or amid the sounds and scenes of the open field, do not spring out of lust for worldly recompense. No, the incentives and compensations are spiritual—they consist of the great joys: the joy of creative activity, the joy of human service, and the joy of merited renown. Were these to fail, then their offspring, all high endeavor, would fail, and therewith excellence, and the dignity of life.

It is, therefore, seemly, Mr. President, and important that a university has for one of its essential functions to note the things men say and do, and to select betimes from the major fields of activity distinguished representatives of high achievement for public recognition and honor. In accord with the bidding of such considerations and with a long-established

custom grown out of them, I now have the honor to present to you, sir, such representatives chosen from a wide variety of important fields: diplomacy and statesmanship, military discipline and organization, medicine, theology, journalism, letters, and the actor's art.

LOVE, SORROW, ART, AND BEAUTY

"From my path that shadow will never lift.
I must go onward to the end in its sacred gloom."

THESE are the closing words of a touching letter received today from a very dear friend (past three score years and ten) telling of the sudden death of his eldest son, a highly gifted noble man cut down in the noon of life.

Is Art sprung from Sorrow? If so, how great an artist must be the Mother of so many tragic worlds.

Perhaps we may thus account for the omnipresence of beauty and the advancement of life. Love, baffled by fate, is sorrowful; sorrow begets art; art, beauty; beauty, love again: and so the cycle is complete.

Is there naught but repetition? No: the rolling wheel advances, rises, expands; and so there is progress—more life, more light, more wisdom, more love endlessly.

CICERO AND MODERN MEDICINE

A FEW years ago when I was a patient in a private sanitarium and my convalescence had advanced far enough to make the Kitchen the most interesting department of the institution, I said one day to my nurse:

"The meals here are excellent. I've noticed, however, that no soup is served, and am wondering why. Please do not think I'm finding fault—I'm asking out of mere curiosity."

In a manner tinged a bit with professional pride and a sense of bestowing upon a curious layman a choice morsel of information known to none save up-to-date physicians and nurses, the good woman said:

"It's this way. Dr. So-and-so, the proprietor and head physician of the hospital, is a great specialist in diseases of the stomach. And *nowadays* stomach specialists do not permit their patients to have soup. Well, the Doc-

tor thinks soup is pretty poor food any way and so he doesn't allow us to serve soup to any of the patients, no matter what their ailments are."

I was a good deal impressed with that "nowadays" as who should not be on being thus let into one of the late secrets of modern medicine.

A few weeks later—I had been meanwhile released from the sanitarium to complete my convalescence at home—when sitting one evening by a table on which there was a pile of miscellaneous books, I took up one that happened to be within easy reach, thinking to beguile an hour and to improve my mind by a little reading before retiring for the night. It chanced to be a volume of Cicero's *Letters.* On opening it quite at random, I found one of those charming letters which the great man, in course of his journey back to Rome on the expiration of his term as governor of Cilicia, wrote to his secretary, Tiro, who being ill was obliged to tarry at Patrae for medical treatment. The letter contains the following passage:

"I also hear what you have written to me that your physician is well spoken of. But I am far from approving the treatment he has given you. You should not have been given soup when suffering from indigestion."

FREEDOM OF WILL

THE literature of this old subject is vast. In respect of dialectic skill, finesse, subtlety, penetration, verbosity, confusion and unconvincingness, it is probably unsurpassed. It fascinates and repels, quickens and fatigues, promises and disappoints—all at the same time. It is too important to ignore, too big and boring to wade through. As something better than a substitute for most of it I venture to recommend a little dialogue which I chanced to hear the other day. The speakers were three, a lawyer, an engineer and a mathematician.

Apropos of something—I have forgotten what—the lawyer made a remark about somebody being 'responsible' for something, whereupon the engineer said to him:

"You astonish me. Do you really believe, as you seem to, in that old dogma—the freedom of the human will, as it used to be called?"

"I do," said the lawyer, "of course I do; that dogma is one of the indispensable bases of Law. Municipal law takes it for granted that people are, normally, responsible for their decisions and deeds. Without that assumption Jurisprudence would collapse like a house of cards. Certainly I believe in the freedom of the will."

"Well, I don't," the engineer replied. "I once did or thought I did but not now. I've thought the thing through and am a thorough-going determinist. Whatever happens happens when it does, where it does and as it does, of necessity. You know what is meant by the resultant of two or more forces. Well, every event, mental or physical, is the resultant of an infinite number of forces. If we knew thoroughly the state of the Universe at a single moment, we could predict in minutest detail the course of universal history for all time to come."

"That," responded the lawyer, "is a terrible thought, perfectly paralyzing—just think what it means—no initiative, no spontaneity, no chance, no freedom, no responsibility, every victory predestined, every defeat pre-

destined, no merit, no demerit, even the very dream of freedom a predestined dream of a predestined lie." Then turning to the mathematician, he said: "What do you think about it? You have been silent. Tell us what *you* think. Don't *you* believe in the freedom of the will?"

"I do in a certain sense," the mathematician said, "but you must permit me to indicate the sense."

"Certainly," said the lawyer, "that is only fair."

"It is much more than fair," said the engineer, "it is absolutely necessary if we are to understand one another."

"Very well then," said the mathematician, "what I mean is this: suppose you are confronted with alternatives, you are in doubt which to choose, you pause to consider, you deliberate; in deliberating you are exercising freedom or, if you prefer, freedom of will; deliberation is the essential ingredient, at once necessary and sufficient."

"Good," exclaimed the lawyer, "you and I agree. You have said just what I mean when I say I believe in the freedom of will."

"You rejoice prematurely," rejoined the engineer; "the question is not yet settled for I contend that that deliberation, each and every step of it and the issue of it, in any given case, are all of them completely determined, as much so as the motion of your body if hurled from a precipice by a sudden gust of wind."

Thereupon the mathematician said to the engineer: "I begin to suspect that we three agree as to the essential facts and are disputing about nothing but different verbal accounts of them. For deliberation is a fact, is it not? I mean that people do deliberate. I mean that deliberation does actually occur and is a very common and very familiar phenomenon. You do not dispute that, do you?

"Of course, I don't," said the engineer, "none but a fool could deny so obvious a fact."

"Very well, then," the mathematician replied, "behold what it is that we are doing. Our friend, the lawyer, and I point to an instance of deliberation and say: that is an example of the exercise of freedom. You cite the same instance and say: that is a specimen of things determined. But deliberation is deliberation, however we describe it. In your de-

scription you have not dragged our conception of freedom down, you have thrust the concept of determination up—you have mightily generalized and even transfigured it."

"I fear I don't quite get you," said the engineer, "please explain what you mean."

"What I mean is this: you have so enlarged and elevated the usual significance of the word determination as to make it cover not only an inorganic thing's mechanical or chemical reactions to mechanical or chemical forces but also a thinking organism's reasoned selection of one from among competing alternatives; you make it cover not only the bitter ignominy of being buried alive but also the nobility of deliberately consenting to dwell in a colony of lepers to alleviate their suffering. You may thus generalize if you like but you must not fancy that, in so doing, you have annulled or even diminished by so much as one jot the immeasurable difference between the things you have thereby huddled together under a single caption. For though you cry that all things are determined, you do not cease to know that in respect of dignity there is an infinite difference between being dictated to

and being invited to consider. Since we agree that human beings have capacity for deliberation we agree upon the essential matter. What is the use of disputing whether deliberation is an exercise of freedom or an infinitely refined specimen of things determined?"

"No use," said the engineer.

"Agreed," said the lawyer.

NO BRAVER MAN

THERE never was a braver man than Edwin Boone Craighead. There never was a finer union of strength, gentleness, and courage.

He was born about sixty-five years ago upon a small Missouri farm. His father died when the son was but a youth. The latter at once became the main-stay of the family, the virtual head of the household, managing the ranch and cultivating its fields with his own hands. The strenuosity of life, thus begun so early, was never relaxed. In his later years Craighead understood for he once said to me:

"Keyser, the trouble with my education has been that I never learned to play."

But he did not complain. For his mother he provided with constant tenderness and generosity till her death at an advanced age. Of his father he said to me:

"When he died I was young but I remember him well—against the storms of life he stood like a cliff."

By dint of prudent management, hard work, and frugality, young Craighead contrived to make his way to an excellent local college. Here he acquired a sound knowledge of Latin, Greek, and English.

Passionately devoted to literature, he resolved to prepare himself well for a career in that great field, with a view not only to teaching but especially to writing. To that end he went to Berlin for in some way he had been led to believe that there he would have a very precious opportunity—that of hearing the inspiring lectures of Professor So-and-so, great Shakespearian scholar, mighty chief of all authorities. He listened to the first lecture—it was pure bibliography; to the second—it was pure bibliography; to the third—it was pure bibliography. Disappointed as only an expectant youth can be and ineffably disgusted, he quit the lectures of the learned Professor Killjoy, packed his trunk and left for Paris where he devoted himself profitably to the study of that city, the French language and general literature.

Upon returning to America Craighhead accepted a collegiate instructorship. He had,

however, a special gift which, though then unknown to himself, was quickly discovered by others, and he was accordingly soon diverted from the teacher's work to that of educational administration, in which he rendered long and distinguished service. As administrative head, as principal or as president, he served the following institutions, in succession, each of them for a term of years:

Clemson College, Clemson, South Carolina.
Central College, Fayette, Missouri.
State Normal School, Warrensburg, Missouri.
Tulane University, New Orleans, Lousiana.
University of Montana, Missoula, Montana.

Craighead's mind was that of a genuine statesman. His educational thought and policies and dreams were large, liberal, and farsighted. In all the foregoing institutions his leadership was daring and creative. It made the school at Warrensburg second to none, save the State University, among the educational institutions of that commonwealth. It made Tulane the leader, in some important

respects, among the institutions of higher learning in the South. In every institution that Craighead presided over the students not only admired him, they loved him; and so, too, did his colleagues, with the exception of a very few who were spiritually too meagre to discern the proportions or to appreciate the character of a really superior man.

What bound his students and his colleagues so strongly to him was, in great part, the fine humanity of the man and his unfailing courage. Perhaps nothing can better illustrate these noble qualities of his personality than the following incident.

One morning during Craighead's presidency of the University of Montana his Secretary came into the President's private office and said:

"Dr. Craighead, there is a young man outside who says he wants to see the 'main Guy' and I guess he means you, sir."

"Show him in," said Craighead.

Presently there entered a young man, shabbily dressed, nervous, embarrassed, and awkward.

"Good morning," said the President, tak-

ing the man's hand. "Take a seat there and tell me what I can do for you. What is your name?"

"Harding—Bill Harding. It's this way. They shet me up last night. I jist now got out. There wuz a feller knowed I wuz lookin' fur a job and he sez fur me to go and see the main Guy in that there big school and he said he guessed he'd mebbe give me a job."

"You spent last night in jail? Why were you put in jail?"

"I dun know. Somebody dun sumthin'—I dun know what—and they jist grab me—I guess mebbe it wuz cause I dun know nobody here and they knowed I jist got out of the Pen."

"You have served a term in the penitentiary? Why were you put into the penitentiary?"

"I killed a feller."

"Why did you do that?"

"He wuz tryin' to kill me. I knowed it and I said he wuz but they sent me up."

"How did you get out?"

"My time wuz up."

"Have you any friends?"

"I dun know. I hed sum before. Mebbe they wouldn't wunt to hev nothin' to do with me now, and so I jist says I'll start new."

"What can you do?"

"I kin work—I haint got no money—I'd like fer to git a job."

Craighead rose, beckoned the man to a window, and, pointing out, said:

"Do you see the house yonder? That is where I live. Take this note to Mrs. Craighead. She will allow you to go into the garden behind the house. The garden needs cleaning. If you do it well, I may be able to give you a job here on the campus."

Bill got a job on the campus.

After a few days he came in to see the main Guy and said:

"There's a feller down there in town sez if I kin go ter Butte right off, I kin git a good job. But I haint got the stuff. I sez mebbe you'd give me a loan. I'd pay it back."

Craighead wrote a note, handed it to Bill with twenty-five dollars and said:

"Can you read?"

"Yas," said Bill.

"Very well, read the note and keep it by

you. Don't lose it. Good bye and God bless you."

Here is the note:

> The bearer hereof, Mr. Bill Harding, has served a term in the State penitentiary. I will personally hold responsible any one who takes an unfair advantage of him on that account.
>
> E. B. CRAIGHEAD.

After a few weeks Bill returned the loan accompanied by a note of thanks.

A great man said of Abraham Lincoln: "He was patient as destiny whose undecipherable hieroglyphs were so deeply graven upon his sad and tragic face. He was willing to wait. He knew that the event was not waiting, and that fate is not the fool of chance."

Patient, willing to wait, knowing that the event was not waiting. What a tribute to "the gentlest memory of our world."

As a *thinker* in the field of education Craighead was superb—creative, clear, magnanimous, daring—a man of vision. But he was not only that. He was a man of action—indeed his strongest impulses were those of a

doer, and he achieved many things. As a doer, however, he had one grave fault, noble in kind, unfortunate in effect: he was too eager for quick results—not patient enough to win the help and comradeship of destiny—unwilling or unable "to wait" till the people he sought to lead could be prepared, by the slow processes of enlightenment, to follow and support. Having clearly conceived some great project, in itself entirely feasible, for improving the educational agencies of the community, he would hasten to present the project vividly by tongue and pen (for he was powerful both as speaker and as writer) and then to urge its immediate adoption, virtually saying to the people: "Unless we are stupid and blind we can not fail to see the excellence of this thing, the glorious results that would follow for our community and the state, and unless we do it at once for our children and our children's children, we are ignoble."

The immediate effect was a pretty sharp division of the community into three classes: a class of noble men and women who, drawn to the man by the magnetism of his courage, humanity, and elevation, supported whole-

heartedly the cause he led; a class who hated him and opposed him bitterly, sometimes openly, but for the most part sneakingly, by intrigue and slander; and, of course, a third class composed mainly of well-meaning people having the misfortune to be stolid, indifferent and sodden-minded. It was so in Fayette; less so in Warrensburg; markedly so in Louisiana; most so of all in Montana, where sheer meanness, concentrated Mammon, and the hired treachery of "politicians" contrived to end Craighead's career as an "official" educator. In bare outline the story of this disaster is quickly told.

When Craighead was called to the presidency of the University of Montana, there was, strictly speaking, no such institution, except in name. In addition to the then small and meagrely equipped school at Missoula, called the University, the state had established, at widely *separated* points of its vast domain, two or three other so-called higher institutions of learning. Among American states Montana was not alone in committing that grave blunder of "separation." Craighead immediately perceived clearly that, if Montana

were ever to have a state university worthy of the name, it was first of all necessary to correct that great initial blunder. He accordingly proposed to the legislature and the people to bring the separated institutions together upon one ground in order that they might be organized to form one institution and be spiritually so united as to grow and develop in the character and proportions of a genuine university. In the course of some months he contrived to have the proposal submitted to the people of the state in the way of a referendum. There ensued a memorable contest. On the one side were arrayed the progressive friends of light and learning; on the other, the agents of "vested interests," darkness, and greed. The former, some of whom were threatened with the loss of their positions, made a valiant campaign, which they came near to winning. But they were defeated and shortly thereafter their gallant leader was deposed, without a word of warning, from the presidency of the University. His friends were shocked and outraged but their protestation was unavailing. They were met with nothing but innuendo, veiled insinuations, and the circulation of

vilifying lies against the reputation of the man they admired and loved.

Thus ended Dr. Craighead's career as an educational administrator but not his career as an educator. The vast region of which Montana was the geographic center had greatly impressed his imagination. His head and heart were filled with dreams of its slumbering possibilities of future greatness in the sphere of spiritual things. He longed to serve it, to set it free. He was without financial means but he had friends, credit, and courage.

After a few weeks of rest and meditation he resolved to venture into the field of journalism and founded at the beautiful city of Missoula *The New Northwest,* first as a weekly and soon thereafter as a daily, which was destined to survive its founder. Craighead had become well acquainted with the "plain people" of the state. He admired their ruggedness of character, their pluck, their honesty and their diligence but their "political" condition filled his heart with pity and wrath. For he had been convinced that to call the state of Montana a *commonwealth* of *freemen* was a bitter mockery. He was convinced that

the plain people of the state had the semblance without the substance of self-government. He accordingly devoted the pages of his journal to expounding the principles and ideals, the ways and standards, the meaning and obligations of civic righteousness and political Freedom, with a view to helping the community to emancipate itself from the worst form of tyranny that can befall a people—the tyranny of depraved politics, of the cunning unveracity of a hireling press, of the power of inordinate wealth concentrated in the hands of a few unscrupulous men controlling legislation for their own ends. More powerful editorials were never written, generously praising any faithful service rendered by public officials, exposing the treachery of high-placed scoundrels, naming their names, and pouring upon them a withering fire of rebuke and denunciation. His methods were effective. His power for good steadily increased. He was soon enabled to establish elsewhere in the state two additional journals similar in aim to *The New Northwest.*

If only his life had been spared for a few more years . . . but why speculate? It was

not to be so. His life had been too strenuous, increasingly so, from youth up. He had not "learned to play." He fell, in the midst of his work, stricken by apoplexy. When the news spread, every rascal in Montana rejoiced—their great enemy had fallen.

I can not but believe that his influence survives and will work increasingly in the subtle ways of the spirit. When the beautiful state of Montana shall have at length become a genuine commonwealth of freemen, it may be that she will then do herself the honor to provide a suitable memorial to commemorate the noble man who, in the darkest days of her slavery, devoted the ripest years of his life to the work of making her free.

The words spoken by Robert G. Ingersoll standing by his brother's bier might have been spoken again with perfect truth at the funeral of Edwin Boone Craighead:

"This brave and tender man in every storm of life was oak and rock, but in the sunshine he was vine and flower. He loved to do kind deeds and were everyone for whom he did some loving service to bring a blossom to his grave, he would sleep tonight beneath a wilderness of flowers."

SIDE REMARKS

DURING many years Edward A. Allen was Professor of the English language and English literature in the State University of Missouri. Beyond the borders of his state he was not well known for he published but little, nor traveled much, being a home-loving man devoted to quiet study and cloistral meditation. A modest man, a ripe scholar, a gentle teacher, with a delicate sense of humor, he was much beloved by his students, his colleagues, and his neighbors.

I had the fortune to be a guest in his home when a devoted friend said to him:

"Professor Allen, tell us, won't you, how you acquired your understanding of English."

"From side remarks," he replied, "made by Professor Gildersleeve when teaching me Greek."

In his teaching, Allen, too, sometimes made side remarks. On one occasion when Fielding was being discussed by a class of men and

women, one of the latter said in a somewhat challenging manner:

"Professor Allen, do you think 'Tom Jones' is a quite proper kind of book for general circulation?"

Instantly came the response:

"I shall always regret that I can never again have the pleasure of reading that book for the first time."

Professor Allen is "dead," as we say. It is not true. His body has indeed perished but the man survives—his kindliness and light still live in the characters and hearts and memories of many generations of his pupils.

MATHEMATICS AND MAN[1]

I HAVE but twenty minutes in which to say, if I can, a helpful and significant word regarding the place of mathematics in the great assembly of philosophies, sciences, and arts.

The existing body of mathematical science is so immense that no individual scholarship can embrace it all. Moreover, the science is growing so rapidly and in so many directions that no individual genius is nimble and swift enough to keep pace with all the developments. And so mathematicians are obliged to specialize in one or more divisions of the general field.

Every one knows that the familiar rudiments of mathematics are essential to the conduct of the ordinary lowly day-to-day affairs of any civilized community. But many good people, even the vast majority of educated men and women, are not aware of the fact that in the higher zones of our civilization the in-

[1] Broadcast in May, 1926, from the station WEAF.

fluence of higher mathematics is everywhere present as a living and life-giving ether. They are not aware of it because mathematics is not a noise-maker. Mathematics is one thing. The applications of the science constitute another. Mathematics is always noiseless. It occasionally happens, at long intervals, that some mathematical application as in the modern doctrine of relativity, does burst like thunder upon the world's attention and gets headlined in the newspaper press. But, like mathematics itself, mathematical applications, though they are innumerable and ever increasing, are for the most part noiseless.

On this occasion I cannot speak of any detail or branch or method of mathematics. I can say nothing of unknown quantities; nothing of x's, y's and z's; nothing of equations and formulas; nor any word about geometric configurations. Confining my remarks to the science as a whole, I invite you to contemplate it as an expression of the human spirit and as a guardian and guide of human life. In a word my theme is mathematics and man. Please come with me as I pass quickly from one large aspect of it to another.

There is probably nothing finer in human speech than the great term—The Humanities. Mathematics is reputed to be the austerest of the sciences. Is it one of the humanities? Two fundamental considerations show that its claims to that high distinction are unsurpassed. For what subjects are best entitled to be called humanities? The answer is: those subjects that best reveal the distinctive nature of our common humanity and best serve to guide our human life.

What *is* the chief mark of man as man? What is the distinctive mark of our common humanity? Undoubtedly it is that composite ability by which the living are enabled to make the achievements of the dead the means of greater achievements, so that science breeds better science, art better art, philosophy better philosophy, justice better justice. For without that composite ability—without that time-binding power, as Count Korzybski has happily called it—progressive civilization would be impossible. Where does this power manifest itself? In all the great fields of human activity. Where is it revealed most clearly? In mathematics, for there the continuity of pro-

gressive development, running from remote antiquity down to our own time and now abounding as never before, is seen in its nakedness. Mathematics is, then, one of the humanities because it thus reveals more clearly than does aught else the most precious thing in the world—the civilizing energy characteristic of humankind.

Let me next direct your attention to mathematics as a guardian and guide of human life. There are, as you know, various great distinctive types of human activity. One of the greatest of these types is what is called *thinking*—the formation and combination of ideas, the relating of these in the form of propositions, the building of these into doctrines for the expression and guidance of life. Thinking may not indeed be necessary to life but it is necessary to human life. Over and above each of the great types of human activity there hovers a shining ideal of excellence—a muse, if you please, or guardian angel wooing us and beckoning us onward and upward along the steep endless path towards perfection. In the case of what is called thinking the guardian angel, the ideal of excellence, is named

Logical Rigor, an austere goddess demanding absolute precision, absolute clarity and absolute cogency. Is this ideal important as a guardian and guide of human life? It is indeed so important that just in so far as our thinking departs from it our discourse sinks towards the level of mere chattering—the noise and gabble of our pre-human ancestors. Where is the standard of logical rigor best revealed? It is best revealed in mathematics for, viewed as an enterprise, this science has for its aim to think rigorously whatever is or may become capable of being so thought. Nowhere else is revealed so clear a vision of the holy goddess of logical righteousness. As guardian and guide of sound thinking mathematics is thus supreme. As our human weal depends more upon sound thinking than upon aught else we see again that no subject can be more humane than mathematics.

The considerations thus far advanced, though fundamental and decisive, are yet only the beginning of what may be said touching the claims of mathematics to human regard. Let me remind you that my theme is mathematics and man. To what I have already said

respecting the humanity of mathematics I am now going to add a statement that some will think extravagant. Yet the statement is true and the truth of it ought to be made known to all. The statement is this: *Every major concern among the intellectual concerns of man is a concern of mathematics.*

Let us consider the matter very briefly. Every one knows that one of the outstanding facts of our world is the great fact of Change. The world of events, whether great or small, mental or physical, is a flowing stream. Transformation, slow or swift, visible or invisible, is perpetual on every hand. But events are interdependent so that change in one thing or place or time produces changes in other things and places and times. With the processes of change every human being—moron, mediocre, or genius—must deal constantly or perish. The processes of change are not haphazard or chaotic, they are lawful. To deal with them successfully, which is a major concern of man, it is necessary to know their laws. To discover the laws of change is the aim of science. In this enterprise of science the ideal prototype is mathematics for mathematics consists mainly in the

study of functions and the study of functions is the study of the ways in which changes in one or more things produce changes in others.

We are here in the presence of another obvious major concern of man. I mean our human concern to ascertain what is permanent in the midst of change. We wish to know what abides. We desire to know what may be counted upon. In this great quest of permanence in the midst of change is found the unity of science, philosophy, art, and religion, for it is the sovereign concern of them all. Is it a concern of mathematics? To find the answer you have only to glance at the vast mathematical literature dealing with the subject of Invariance.

Next consider Relations. The terms father, mother, parent, child, neighbor, partner, enemy, friend, greater, less, better, worse, and so on and on are familiar examples of relations. Each thing in the world has named or unnamed relations to everything else. Relations are infinite in number and in kind. To be is to be related. It is evident that the understanding of relations is a major concern of all men and women. Are relations a concern of

mathematics? They are so much its concern that mathematics is sometimes defined to be the science of relations.

For want of time I must pass over many grave considerations in silence, having but a moment in which to say, finally, three things.

First, since the days of Plato it has been known that the things with which mathematics primarily deals are indestructible essences, mathematical truth being thus pure and everlasting.

Second, in mathematics and nowhere else the conception of Infinitude is treated in strict accord with the laws of logical rectitude.

Lastly, religion, theology, art, philosophy and the meditations of your heart unite in showing that our human interest in the infinite and eternal, so characteristic of mathematics from time immemorial, is supreme among the concerns of man.

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MATHEMATICS AS A CAREER[1]

THE aim of this article is to help college and university students having a bent for mathematics to answer some of the questions they ought to consider before deciding whether or not to devote their lives to this field of science.

The questions to be considered may be taken up under the following four heads: Interest and Ability; The Nature, Scope, Vitality (or Progressiveness) and Dignity of Mathematics; The Period of Preparation; The Mathematician's Rewards.

INTEREST AND ABILITY

In speaking of mathematical ability I shall mean *native* mathematical ability, in accord with the proper sense of the familiar saying that the mathematician is *born,* not made.

[1] Except a few lines of it this essay was published in *The Scientific Monthly,* vol. XVII, No. 5, having been written upon request of The National Research Council for distribution as one of a series of "Career Bulletins" for the guidance of University students.

Every one knows that mathematical ability and interest in mathematical study often go together. And it is commonly believed that the two things are always associated in such a way that intensity of interest implies a high degree of ability, and that superior ability implies corresponding interest (actual or potential). But that belief is erroneous. Every experienced teacher of mathematics knows very well that a student whose mathematical ability is meagre may yet feel and manifest a lively interest in mathematical studies. On the other hand, it occasionally happens that a student having indubitably great mathematical gifts has relatively slight interest in the subject. What I have said of mathematics is equally true of every other form or field of activity.

It is thus evident that what may for a time seem to a student to be an inner summons to mathematics or another subject may or may not be a genuine call thereto. Such a summons requires to be scrutinized carefully, for the choice of a vocation is a momentous act. I do not mean that choice should be deferred in the hope of resolving all doubt, for in such matters complete elimination of uncertainties is im-

possible. Yet one must decide or drift; and so the decision must be adventurous. But the adventure need not be rash: it may await, not certainty, but the weighing of probabilities.

I believe it safe to say that, with very rare exceptions, a student may not wisely choose mathematics for a vocation unless he has asked, with respect to himself, and has been able to answer affirmatively, the following questions:

Is my seeming interest in mathematics genuine?

Is it an abiding interest?

Does it exceed my interest in every other subject?

Is it deep and strong enough to stimulate my powers to their highest possible activity and cause mathematical work to be for me, not irksome toil, but a labor of love?

Have I sufficient mathematical ability to read a solid mathematical work with fair facility and good understanding?

Does my mathematical ability exceed my natural ability in every other subject?

Do I possess in fair measure the natural gifts essential to the qualification of a success-

ful teacher of high-school pupils or college students or university undergraduates?

Of the foregoing questions the first one is intended to guard the student against the danger of mistaking for interest in mathematics such transitory delights as a bright student is likely to have in class-room competitions under the quickening influence of a live teacher. If a student have genuine interest in the subject, he will know it, but if his "interest" be spurious, he may be deceived.

The last one of the questions appears to be justified in view of the fact that in our country young men aspiring to a career in mathematics have seldom been able to escape the necessity, even when they have desired to do so, of giving a good deal of their time and energy to the work of undergraduate instruction—a necessity from which early relief does not seem probable.

Ordinarily, a student may not hope to arrive at trustworthy affirmative answers before his studies have advanced far enough at least to include substantial courses in Analytical Geometry and the Calculus. In any case he should seek the counsel of his instructors,

especially if they be candid men of mathematical reputation and good judgment.

A more difficult problem presents itself in the case of those rare students who have no decisive predilection for a single subject but have talents and interests qualifying them well and equally for adventure in any one of two or more great fields. It is a pity that such a student can not wisely make it his vocation to cultivate all the fields at once or in succession. There is always something tragic in having to specialize, for in a profound sense the subject of all science is one whole. But the whole is too vast and complicated for the limited powers of one man; whence the necessity whose tragic quality is felt with special keenness by a student of diversified gifts and interests. The fields in question may be or seem to be widely sundered, as geology and linguistics, for example; or they may be obviously adjacent, closely related, interpenetrating, as physics and chemistry, for example, or zoology and botany, or philosophy and mathematics. If the fields be intimately related a student of the mentioned type may aim at a career in two or more of them combined

provided he be endowed with a measure of genius like that of Helmholz, for example, or Henri Poincaré, who won eminent distinction in astronomy, in physics, and in mathematics. But men of such capabilities are exceedingly rare. Ordinarily, a student whose tastes and talents qualify him well and equally for two or more important subjects ought to choose one of them definitely and resolutely as a *vocation,* reserving the others not less definitely and resolutely as *avocations;* for ordinarily such a decision will be most favorable to health and happiness, to depth and breadth of culture, to good citizenship in the commonwealth of science, and to the service of mankind.

Research Ability and Its Tests

I have thus far said nothing about research, having reserved it for special consideration because of its grave importance. There is hardly another term so often heard in university circles and no other is mentioned with quite so much respect. Indeed, one sometimes gains the impression that scientific men—or some of them—regard research as being, in

comparison with all other activity, not only awe-inspiring but sacred or holy, almost divine. Not infrequently men speak of it with a solemnity like that of a sinner recommending virtue and righteousness, and doubtless they sometimes do it from similar motives, conscious or unconscious.

What does the term mean? In current use it has two meanings, differing in respect to dignity—a minor meaning and a major one. In mathematics the minor meaning of the term research covers a large variety of work which, though valuable, involving something of the spirit and art of discovery and adding somewhat to the body of mathematical knowledge, yet requires neither creative genius nor a *very* high order of talent. I refer to such work as that of effecting improvements in the exposition of classical doctrines; the discovery of new theorems of ordinary difficulty, interest and importance; new demonstrations of important old theorems; the invention of new but subordinate methods; the detection and correction of imperfections in established theories, and so on. Much of the matter found in journals devoted to what is called research

is of the sort I have indicated. Of course, it does not represent research in its major sense.

The major meaning of the term—mathematical research—is clearly revealed and rightly represented by nothing save the great achievements of creative mathematicians. Such creative activity assumes various forms. It may show itself in the discovery of a powerful *method,* like the analytical geometry of Descartes and Fermat or the calculus of Newton and Leibniz; it may show itself in the creation of a great *doctrine,* like the projective geometry of Desargues and Poncelet or the function-theory of the complex variable (Cauchy, Riemann, Weierstrass); it may show itself in the form of historical research, as in the monumental *Geschichte der Mathematik* of Moritz Cantor; it may show itself in the form of contributions to the logical foundations of the science, as in the *Principia* of Whitehead and Russell or the *Tractatus* of Wittgenstein; it may show itself in the *applications* of mathematics to empirical science, as in the Einstein Theory of Relativity or the Quantum Theory of Planck.

Is it possible for a student to ascertain with

a good degree of certainty whether, in the event of his choosing mathematics for a vocation, he may confidently aspire to a research career in the subject? Yes and no. If he can answer affirmatively the foregoing test questions respecting interest and ability, then he may, I believe, fairly assume that his powers are adequate for research in the minor meaning of the term; but with respect to the major meaning no such guaranty is possible. Just here the element of adventure, which choice always involves, is seen at its maximum. For there can be no conclusive evidence of having the power to do great things except achievement.

The Nature, Scope, Vitality and Dignity of Mathematics

The nature of mathematics: A competent student of mathematics whose studies have not advanced beyond a solid year of calculus will not know profoundly or critically what mathematics essentially and distinctively is, but he will have felt its appeal and gained some sense of its power. In this brief essay not much can

be said regarding the essential nature of mathematics. I venture to refer such students as may be interested in that great question to my "Mathematical Philosophy,"[1] where a serious attempt has been made to set the matter in clear light and where they may find a clue to the literature. Here I can barely touch the subject and must content myself with making a few careful, though unargued, statements having for their principal aim to discriminate justly and clearly between mathematics and natural science.

Natural science employs logic as an instrument, a tool. But to speak of logic as a tool of mathematics is meaningless. Logic is not a tool of mathematics—logic *is* mathematics. All strictly mathematical propositions are propositions of logic, and conversely. But no propositions of natural science are propositions of logic, or mathematics, though the latter propositions are such that the best of the former can not be established without them.

Mathematical propositions are true *unconditionally*—which means that their validity

[1] E. P. Dutton and Company, New York.

is independent of the facts investigated by natural science. But propositions of natural science are only true *conditionally*—on condition, that is, of their agreement with the possible facts asserted by them. Suppose, for example, that *p* and *q* are propositions of natural science. The mathematical proposition—if *p* is true and *p* implies *q*, *q* is true—is true no matter whether *p* or *q* or '*p* implies *q*' is true or false.

All propositions of natural science are *empirical,* which means that, if a proposition of natural science be true, knowledge that it is true can not be gained by inspecting the meanings of the proposition's terms but rests ultimately upon sense-perception—upon external observation—upon comparison of the proposition with the fact asserted by it. *No* mathematical proposition is *empirical;* knowledge that a mathematical proposition is true can not be gained by sense-perception—by comparison of the proposition with any fact or facts of the external world; the evidence of its truth is wholly contained in the meanings of its terms; and knowledge of its truth results from analyzing those meanings. The

processes of what is called mathematical proof are nothing but the processes of such analysis.

Mathematics is silent respecting the empirical realities of life and the world. Yet it is infinitely important as a means for our dealing with them effectively. For it is mathematical propositions, and only they, which enable us to advance by *inference* from given propositions which do relate to empirical realities to new propositions relating to them. Without the process of such *inference,* made possible by mathematics, natural science, even civilization itself, would be impossible.

The scope, vitality and dignity of mathematics: No student need hesitate to choose mathematics for his vocation because of any fear that this subject, when compared with others, may be found to be inferior to some of them in scope, or in vitality and progressiveness, or in dignity.

Consider the question of scope. We know that the world of empirical reality—the subject of Natural Science—is so vast and complicated that each of the natural sciences has for its scope but one aspect or fragment of the world. But we do not know whether the

facts composing the world of empirical reality do or do not constitute an infinite multitude; and so we can not assert that the answers, if we had them, to all the questions that all the natural sciences combined might ask would constitute an infinitude of propositions. With respect, however, to non-empirical truth, with respect to facts of logic, with respect, that is, to propositions that are unconditionally true, the situation is different: we know, from the internal evidence of the case, that mathematical propositions, known and unknown, together constitute, not merely a vast multitude, but an infinite one. Even the body of *known* mathematical propositions is so large that, as I have elsewhere [2] said, "no man, though he have the wide-reaching arms of a Henri Poincaré, can contrive to embrace them all."

With respect to vitality and progressiveness it may be confidently said that mathematics is not surpassed by any branch of science. Its developments in our day proceed so rapidly and in so many directions that the ablest men, being unable to follow all the developments, are obliged to specialize within the general

[2] "Mathematical Philosophy," p. 21.

field. Ours is indeed the golden age of mathematics. Not less than eight international congresses of mathematicians were held prior to the World War. More than 500 scientific journals are devoted in part, and more than two score others are devoted exclusively, to mathematical publications. As many as 2,000 mathematical books and memoirs drop from the press in a single year. In all the great culture nations are found flourishing mathematical societies. The American Mathematical Society, which is primarily devoted to research, and publishes two journals, has about one thousand members. The membership of the Mathematical Association of America, which publishes one journal, is still larger. And in our country, as in others, there are numerous organizations aiming at improvement in the teaching of elementary mathematics.

Nor is the activity thus indicated confined to "pure mathematics." "Applied mathematics" is not less alive. And here I must say a word about those two terms. It is customary to speak of mathematics, of pure mathematics, and of applied mathematics, as if the first were

a *genus* owning the other two as *species*. The custom is unfortunate because it is misleading. "Pure mathematics" is a superfluous term, for it simply means mathematics and nothing else. The term "applied mathematics," which came into use before the essential nature of mathematics had been discovered, is a misnomer. The uses or applications of mathematics no more constitute a species of mathematics than the uses or applications of a spade constitute a species of spade.

Of present-day activity in applications of mathematics to questions of empirical science the tokens are numerous and striking. It will be sufficient to refer to two of them, mentioned before—I mean the Relativity theories, of which every one has heard, and the not less significant Quantum theories of Planck and others. These two examples have special value on another account. For they teach a most important lesson which it is very hard for the world to learn and they show at the same time how silly it is to debate whether devotion to mathematics or devotion to its applications is the better form of scientific service. The lesson is that a mathematical theory, however ab-

stract and seemingly "useless," will sooner or later get applied to problems of empirical science. For example, the mathematical theory of probability, which had its origin in common games of chance, today plays a fundamental rôle in Quantum theory and the kinetic theory of gases. Again, nothing could appeal less to a born utilitarian than the frightfully abstract and complicate Theory of Tensors constructed long ago by Riemann and Christoffel. Yesterday, however, that idle theory became the "backbone" of the General Theory of Relativity. A similar tale could be told of many other mathematical theories long pooh-poohed as idle curiosities—non-Euclidean geometries, for example, and the doctrines of hyper-spaces. It is not only astronomy and physics and chemistry that are open to the invasion of mathematical students with a bent for applications but philosophy and psychology, botany and zoology, statistics and economics, and every variety of engineering.

In view of the foregoing considerations it would be superfluous to inquire concerning the relative dignity of mathematics in the general assembly of sciences and arts. Students

desiring to inform themselves in respect to the esteem in which mathematics has been held from time immemorial by eminent men and women representing all fields of intellectual and spiritual activity may be referred to Professor Moritz's superb "Memorabilia Mathematica."

The Period of Preparation

What is to be said under this caption with reference to mathematics applies quite as well to every other cardinal subject. The period of preparation usually includes two or three years of university residence devoted to what is called graduate study subsequent to graduation from college. During these years the student will be in fact, if not officially, a candidate for the degree of doctor of philosophy, and his period of preparation for a scientific career will usually terminate when he has gained the degree. To gain the degree he must produce a dissertation embodying the result of fairly independent and somewhat original work and must pass an examination, which may be oral or written or both, in the general field (or fields) of his studies.

The gaining of the doctorate is not regarded as conclusive evidence that the student has research ability in the major meaning of the term as above explained. It is regarded, and rightly regarded, as signifying that the student has attained a fairly high degree of scholarly competence in his field of study and that he possesses research ability in at least the minor meaning of the term. On this account the fact of having won the doctorate is distinctly helpful, and in some instances is even essential, in obtaining a position, especially a college or university appointment, and thereafter in obtaining promotion. It is true that not all doctors of philosophy are scientifically productive; on the other hand, some of the most productive scholars within and without the universities have not held the doctorate; it is also true that pursuit of scholarship and pursuit of a degree, though they are compatible, are not the same. Nevertheless, in view of the prevailing practice, a student aspiring to a university career in mathematics or another subject will find it advantageous to make whatever sacrifice may be necessary for gaining the doctorate.

I have felt constrained to make the preceding statement despite my conviction that in our college and university circles the significance of the doctorate has been and still is greatly overestimated. The chief satisfaction I have personally derived from holding the doctorate is that of being able to express my estimate of it without danger of being answered by the insolent cry—sour grapes. To every university faculty there ought to be appointed some productive scholars not having the degree so that by their presence and activity it would by demonstrated visibly that the degree is not essential and that the contrary belief is an inherited academic myth. For a further discussion of this subject the reader may consult lecture XVII of my "Mathematical Philosophy."

The Mathematician's Rewards

First, a word respecting material rewards. Having gained the doctorate, the young mathematician can readily obtain a college or university instructorship at an initial salary of perhaps $2,000. He will instruct undergraduates and may be permitted to offer a

graduate course. If he be a successful teacher and especially if, in addition to that, he wins repute for research work, he may confidently expect advancement, in three to five years, to an assistant professorship with a salary of $3,000 to $4,000; and, in ten to fifteen years, to the rank of full professor with a salary of $4,000 to $6,000. A few men of long service and scientific eminence receive as much as $8,000 to $10,000. The material rewards of the mathematician are notably inferior to those of some of his university colleagues, in law, for example, in medicine, and in engineering, for these, in addition to their professorial salaries, often receive incomes, sometimes large incomes, from outside practice of their professions—professions whose service, though it is not superior to that rendered by the mathematician, is more obvious to the indiscriminating multitude, called the public. But the genuine devotee of science is not disheartened by the spectacle of such *iniquity*. He is content with such an income as enables him to support his family decently and to do the work to which he has been summoned by the inner call of his talents.

The life-work of the mathematician is richly compensated; but the compensations are not material—they are spiritual. One of them is the joy of life-long contact and intimate association with the eager minds of the young. Another is life-long companionship with men devoted to science and other fields of scholarship. Another is the privilege of long summer vacations affording special opportunities for study, research, writing and travel. The mathematician's subject is an honored one. His life is a life of perpetual contact with fundamental thought. He knows that his science is the science of eternal verities. He knows that its service is essential alike to the prosperous conduct of ordinary human affairs, to the advancement of science and to the support and progress of civilization. And, though he can not gain material wealth, his work, if he be a man of genius, may bring him fame—"the lofty lucre of renown."

MANY VALID ETHICAL DOCTRINES, NONE UNIVERSAL

ETHICS has its roots in certain sentiments. What the sentiments are is indicated by such terms as right, wrong, good, bad, better, worse, evil, duty, obligation, ought, ought not.

Like everything else, the ethical sentiments are what they are. Wherever they occur, whenever they occur, they occur as facts, as facts of nature, as constituents of human experience, as joint products of the world and the individual. They are neither more nor less mysterious than any other phenomenon.

The scientific study of ethics is the scientific study of these facts as facts, as genuine constituents of the Space-Time manifold. Science does not ask why the sentiments are, any more than a botanist asks why plants are or than a zoologist asks why animals are or than an astronomer asks why stars are. Such why-'questions' are not questions, they are pseudo-questions. The facts are given, they are data.

Science takes them as such, examines the conditions and modes of their manifestation, the relations among them, the ways of their behavior.

The ethical sentiments fashion conduct; they beget rules of behavior; they engender judgments, which get gradually expressed in propositional form. The propositions, which often take the shape of commands and inhibitions, are empirical—outcomes of experience.

Do such propositions, taken together, constitute a doctrine of ethics? Obviously they do not. Why not? Because they are so incompatible that, when taken together, they present a chaos, not a body of consistent propositions, much less a logically organic body.

Why are they so incompatible? Because the sentiments from which they spring are inconsistent, non-uniform and impermanent. They differ in the same individual at different times; they differ in different individuals, and different communities, at the same time. They are subject to the vicissitudes of a fluctuant world of which they are part. Ethical sentiments are functions of time and place, of circumstance, of experience, of history. As they

differ and change, the rules begotten of them differ and change, the judgments engendered by them differ and change, the corresponding propositions differ and change.

Consider such pairs of ethical propositions as the following:

It is wrong to enslave one's fellowmen.

The institution of slavery has produced much good in the world.

It is wrong to eat meat.

It is not wrong to eat meat.

It is wrong for women to appear in public with their faces unveiled.

To deny women that privilege is wicked and silly.

Sometimes it is right for the people of one state to slaughter the people of another.

Such public killing is always as bad as private murder.

An eye for an eye and a tooth for a tooth.

Lex talionis is unjustifiable—if smitten on one cheek, turn the other.

Polygamy is execrable.

Polygamy is a divine institution.

Democracy is the best, monarchy the worst.
Monarchy is the best, democracy the worst.

Anarchy is better than any form of government.
An anarchist is a loathsome monster.

Humility is a virtue.
Humility is a symptom of feebleness and moral decay.

To introduce among the fundamental principles of government a provision designed to prohibit the making of a glass of beer is worthy of a great and enlightened people.
Such a law is a vicious kind of intemperance, ignorant, low-flying and fanatical.

To whip a child is brutal.
Spare the rod and spoil the child.

Capital punishment is never justifiable.
Capital punishment is essential to justice.

Private ownership of property is wrong.
Private ownership of property is right.

It is always wrong to lie.
It is sometimes one's duty to lie.

A literally endless array of ethical propositions were we to assemble them from all the times and places of human life. It is evident that to call such a chaotic conglomeration an ethical doctrine would be merely to make a meaningless noise.

That is very obvious. Yet *A* will say: my ethical propositions are true; *B*'s, which concontradict mine, are false; mine constitute the true ethical doctrine.

What does the scientific student say? He says: *A*'s ethical propositions are ethical propositions; so, too, are *B*'s; so I see that ethical sentiments are conflicting, that ethical judgments are inconsistent, that ethical propositions are incompatible, that the ethical facts present in the actual world are such that no single self-consistent doctrine can be constructed to embrace them all.

Is it, then, impossible to construct a self-consistent ethical doctrine? I am far from thinking so. It is possible, I believe, to construct many of them. But how? By division. Indeed such doctrines already exist. It is merely necessary to identify them—to pick them out of the jungle. In saying this I assume

—what, I believe, will be readily granted—that no ethical proposition in the vast conglomerate assembly of them is contradicted by all the rest. I assume, in other words, that each of the propositions is consistent with a considerable number of others. Well, then, it is theoretically possible—and is no doubt in a good measure practicable—to sort the vast totality of ethical propositions into sets—how many I know not—such that the propositions of any set are compatible with one another. The propositions of such a set constitute a self-consistent doctrine, or system, of ethics. Evidently the number of ethical doctrines, or systems, is the same as the number of the sets, whatever this number may be.

Consider one of the doctrines. Is it a valid doctrine? It is easy to see that it is. Reflect that its propositions express the ethical judgments, and are thus faithful to the ethical sentiments, of one human being or 50,000 or 100,000,000 human beings. These sentiments, these judgments, are a part of the actual world. In setting them forth the doctrine is a faithful account of a part of the actual world. In that sense it is valid and there is no other sense in

which a scientific doctrine can be valid. Another one of the ethical doctrines is valid in the same sense. Two of the doctrines contradict one another at some points. What of it? It is not your fault and it is not mine. It is just a fact—a very important fact—in the natural history of ethics.

THE ENTERPRISE OF DEMOCRACY[1]

WHAT does the term democracy mean? I am not in quest of a definition. There is none to find. Nothing that is really great can be defined. I am asking what democracy means as I would ask for the meaning of justice, for example, or liberty or love or knowledge or life itself.

No one can face that question thoughtfully without feeling a mingled sense of humility and exaltation. To answer it worthily, in our hearts and in our minds, may not be easy for any one, but it is an obligation, a primary obligation, upon us all.

Are we Americans of this generation qualified to keep the obligation? It may be that our qualification is less than we are prone to imagine. We have been enjoying the blessings of a large measure of freedom but we have not

[1] Extract from an address at the opening exercises of the 164th academic year of Columbia University, September 26, 1917. Printed in the *Columbia Alumni News*, September 28, 1917.

earned them. We have them as a gift from our fathers. It may, therefore, be that to expect from us a profound appreciation of democracy is like asking children of a happy home for a poignant valuation of parental love. At all events, one element our discipline has lacked—the element of suffering; and it may be that the ripening of our wisdom is destined to await the discipline of pain. Meanwhile there is open to us the student's way, the way of reflection. How may we in this way acquire a worthy conception of what democracy means?

To evaluate a cause that has ceased to operate, to appraise a movement that has spent its force and come to an end, we naturally turn to its record and endeavor to compute its worth in terms of achievement. But in case of democracy, great as its achievements have been, in the case of a movement owning the law of continuous evolution, gathering strength with the increase of years, immortal as the race of men whose destiny is its care, the historical method can not suffice: the greatness of democracy is disclosed in its *principles.*

Where are these to be found? Where are the revealing principles themselves revealed? Not in declarations of independence nor in bills of human rights nor in charters of freedom—not in *words*—but in the living realities known as human feelings, deeper than speech, having their rootage in the elemental instincts and impulses of human life, felt in the souls of all men and women except autocrats and those pitiable creatures whose spirit autocracy has seduced by purchase or flattery, or broken by oppression, or mutilated by vicious education.

What are these living realities? They are a composite sense of being one of humankind; the feeling we have as individuals that the life in us is a racial life belonging to all; the feeling of normal men and women that they have been born to the freedom of autonomous beings endowed as such with the authority and the dignity of self-determined action, capable of initiating currents in history, of giving purpose and direction to the aimless energies of the world; the feeling of such beings that they are equal in respect to the sovereign distinction of being *human;* the impulses that make

for life and its amelioration—the manifold creative impulses towards truth and beauty and benefaction; the altruistic feelings of sympathy, of human brotherhood, of comradeship, of obligation, and charity, making the weal of all the concern of each; the sense of being so intimately united with other selves that the instinct of self-preservation and self-realization, transfigured by intelligence and love, becomes the angel of human service: these feelings and their kind—blended sentiments of individual and race, deep as the nature of organic being, transmitted to the children of men from generation to generation—these immortal sentiments of father Man are the principles of Democracy.

And when we contemplate their significance, when we perceive how the principles in their intent penetrate our human life in all its dimensions—not merely the domain of politics and government, where we are accustomed to look for them—but the domain of education also and religion and science and industry and letters and art; when we see the principles at work, not only in these conspicuous and articulate ways, but even more

profoundly, if more obscurely, in the dumb striving of our fellow creatures everywhere to come into their own, to bring to maturity through individual effort and cooperation whatsoever may be common and whatsoever may be unique in their latent powers, as if the possession of these involved a compelling sense of a sacred trust, then there dawns upon us the vision of democracy itself: the vision of an enterprise, as old as human aspiration, as enduring as hope, as embracing as humanity, infinite in its reaches, having for its aim the free cooperation of all mankind in the creation of a good life.

Perfection is a concept and a dream. Upon the endless winding shadowy way of our pilgrimage thitherward, there is no light but the divine radiance of our human ideals. The light of democracy is the shining of the supreme ideal—a world wherein freedom and its fruits bless all mankind.

Rightly understood, the term in question is the greatest word in speech—greater, infinitely greater, than peace. To promote peace it is necessary to value truth, it is necessary to value more than mere tranquillity those things

without which peace is a mockery. Peace without freedom, without justice, peace imposed by the arrogant will of a malignant autocracy, peace dictated by men murdering their fellow men in the name of God, such a peace can be acceptable to none but slaves; it can be precious to none but cowards. The enterprise of democracy is a holy enterprise. It embraces all that is worthy in the aspirations and activities of our humankind.

DESCRIPTION AND DEFINITION

DESCRIPTION is one kind of thing. Definition is another. I shall not endeavor to define the former nor, except incidentally, to describe the latter, being content, for the present, merely to exemplify them.

Consider the two following statements:

(1) A circle is *a round thing like a hoop or a ring.*

(2) A circle is *a plane set (or ensemble or locus) of points such that, if A and B are any two points of the set, they are equi-distant from a point C (of the plane), and that, if A is a point of the set and B is a point of the plane but not of the set, they are not equi-distant from C.*

The italicized part of the former statement is a description. The italicized part of the latter is a definition. The latter is mathematical. The former is not.

Definition and description resemble each

other but the resemblance is superficial. Yet it is sufficient to deceive; and the two things are commonly confounded, as in the "descriptive" sciences, in "speculative" philosophy, in what is called literature, in journalistic writing, in oratory and common conversation. Fortunately the confusion has not been quite universal. If it had been, the world would be without exact science, without rigorous thought, without mathematics, without any guidance of Logic.

Description is essential to all discourse. Definition is not; but it is essential to discourse of determinate meaning—to discourse that knows precisely what it is talking about and what it is saying—to discourse that is clear, logically coherent, moving lawfully and inevitably from premise to conclusion.

Without definition demonstration is impossible. Without demonstration we are wholly dependent upon conjecture. Conjecture is born of Intuition, a very precious and very prolific mother. But mathematicians know, if mystics do not, that the deliverances of intuition can not be taken at their face value —they require to be examined, submitted to

the processes of minute analysis, definition and demonstration. The office of intuition is indispensable but its office is that of suggestion, of intimation, of premonition, yielding suspicion that such-and-such a situation may obtain, that such-and-such a relation may be valid, that such-and-such a proposition may be true. The function of intuition is, not to dispense with investigation, but to initiate it, in a measure to guide it, but never to dictate or determine what its findings shall be. Intuition is for the beginning of research, not for the ending of it—the ending is demonstration, and to this, as I have said, definition is an indispensable preliminary means.

Are the two realms—that of the describable and that of the definable—co-extensive? No. Both are endless but the former, which includes the latter, surpasses it by far, even infinitely. There is indeed nothing that admits of *complete* description, for things are so interrelated that, however much we may say of a given thing, there ever remains more to say of it; and complete description of one object would involve—in fact it would *be*—complete description of every other. Yet any

object, whether of sense or of thought, admits of endless description. The domain of definition is far less inclusive. In itself it is inexhaustible. But beyond its borders are the greatest things noted in human speech. Such, for example, are: Life, Love, Matter, Mind, Philosophy, Poetry, Science, Art, Wisdom, Religion, Justice, the Good, the True, the Beautiful, the Universe itself. Just because these are so precious, definition is precious, for definition is one of the essential means by which we humans come into better and better relationship with the great Indefinables of the world.

The process would be greatly facilitated, for the growth of knowledge would be quickened on every hand and human discourse immeasurably improved, if the colleges and universities throughout the world were to give regularly to all students competent instruction in Definition: in its nature, its scope and limitations, its history and development, its varieties—nominal, real, concrete, abstract, analytic, synthetic, postulational—and especially its rôle in the architecture of thought in every field.

In order to establish a sound tradition in the matter it would be very helpful if, for a few years, the professors themselves, no matter what their subjects, were to attend such a course of instruction. For definition is an instrument that all teachers and all investigators must employ. Unless it prepares suitable matter, logic can not operate.

Logic is not life but a life without logic is sub-human.

GREAT MEN AND *GREAT* MEN

WHEN you say, speaking judiciously, that So-and-so was 'a great man,' the meaning you intend to convey is not the same as the meaning you intend to convey when you say, again speaking judiciously, that So-and-so was 'a *great* man.'

The difference between the two meanings is vast. Of course it does not exist for one whose motto is *nil admirari* and marvels at nothing except himself.

What *is* the difference? I shall not here attempt to define it nor even to describe it, much less to measure it. For my present purpose, which is merely that of suggestion, it will be sufficient to exemplify it. And a few examples will do.

Euclid, Diophantus, Archimedes were great men; Socrates, Plato, Aristotle were *great* men. Alexander, Caesar, Demosthenes, Cicero, Lucretius were great men; Gautama and Confucius were *great* men. Francis Bacon, Cer-

vantes, Machiavelli, Luther were great men; Shakespere, Dante, Leonardo da Vinci, Michelangelo were *great* men. Daniel Webster was a great man; Abraham Lincoln, a *great* man. Kant and Helmholz were great men; Louis Pasteur was a *great* man. Theodore Roosevelt was a great man; Woodrow Wilson, was, I suspect, a *great* man.

It is an interesting exercise to select from the more eminent men and women of history a list of fifty or a hundred names and then try to decide which of the two categories in question they respectively belong to. The exercise is to be specially recommended to bridge-addicts and others suffering from over-exertion of the higher mental faculties because it affords a gentle and delightful recreation requiring but little knowledge and making only the slightest demand upon the more delicately organized parts of the brain.

Some have asked: Was Jesus a great man or a *great* man? In the opinion of many the distinction in question does not rightly apply to Jesus for Jesus, they say, was not a man but was at once God *and* man, the God-man. In *Ecce Deus,* the author, Professor W. B.

Smith, has assembled an impressive mass of evidence to show that Jesus was not a man but was a god, as Isis, for example, or Zeus, or Thor was a god. But that is a question whose consideration requires a degree of emancipation to which not many persons in so-called Christian lands have yet attained.

THE NEW WISDOM AND ITS OBLIGATIONS[1]

It is evident that to meet the great demands of the coming time men and women must needs have a spiritual equipment—intelligence, imagination, sympathy, understanding—far surpassing that which has hitherto been deemed sufficient. For in the time to come men and women cannot be, as hitherto, mere dwellers in a province or mere members of a commonwealth, a state or a nation. Whether they will or no, they are destined to be, in respect of their interests and their obligations, citizens of the world. As competent citizens of the world they will have to be either competent leaders in the affairs of world citizenship or—what is not less important—competent judges of such leadership. Provincial wisdom, however precious or fine, cannot

[1] Printed in the *Columbia University Quarterly*, April, 1919. It was written in relation to the proposal, then under discussion, to establish in Columbia College, a course in Contemporary Civilization, now regularly given in that institution.

longer suffice. What is demanded is a certain large intelligence—a certain wisdom, as we may call it—about the world.

Thereby educational institutions, especially colleges and universities, are placed under a new obligation: they must learn what the new wisdom is or is to be; they must themselves acquire it; they must discover and employ the best means for inciting and guiding young men and women to its acquisition. Here are involved grave and difficult questions. In the nature of the case there is to be found no neat formula for answering them. A little reflection, however, will avail to discover the general direction of the way to light, some of the difficulties to be overcome, some of the dangers to be avoided, and some of the gains that may be reasonably expected.

It is hard to imagine a more impressive or more inspiring spectacle than that of teachers and students keeping constantly before them the open atlas of the world. The atlas is composed of many interrelated maps, extensive, diverse, complicate; for it is not merely a matter of geography, of physics, or physical environment, but embraces all the cardinal

concerns of man. And so there will be not only the map of the physical world, but the map of philosophies and religions, the map of political theories and institutions, the map of economic doctrines, organizations, and movements, the map of traditions and histories, the map of endlessly diversified human instincts, impulses, lusts, passions, aspirations, blindnesses and visions, knowledges and ignorances, past, present, here, there, yonder, wherever children play, and men and women love and toil, suffer and hope.

How is a teacher or a student to deal profitably with a course of instruction involving matter so diversified, so intricate, so boundless? Can the thing be done? If the doing of it require the teacher to have, or the pupil to acquire, mastery, authority, expertness in each of the great subject-matters involved, the thing can not be done; for mastery, authority, expertness, I do not say in all but in one of the great component subjects, taken in its full range of the world, past and present, is alone beyond the powers of one human mind to achieve.

Perhaps such manifold expertness, so evi-

dently impossible, is not essential. Something depends upon aim, upon purpose. History, philosophy, politics, economics, natural science, and the rest are indeed distinct things, but they are not independent; they do not constitute a radically pluralistic universe of spiritual interests; they are not literally, they are literally not, divisions of something; they are only so many persistent emphases—distinct but closely related emphases—in the curious address great Nature continually makes to the human mind; they are but differing aspects of one gigantic whole. The new intelligence—the new wisdom to be gained and given—is to be primarily and in the main a wisdom about the whole as a whole. What can such a wisdom be or signify—a wisdom that is to be wisdom about a great whole, but which does not presuppose or imply in its possessor expert knowledge of its cardinal parts? Can such a wisdom be significant?

The question relates to the possibility and value of viewing immense and complicate things in perspective. In this connection analogy is our sole guide. Every one knows that it *is* possible to gain a perspective view

of things immense and complicate—a vast city or sea or plain or mountain system or all of them; and every one knows that such a view, though the gaining of it does not imply familiarity with the elemental scenes involved, is yet, in addition to its impressiveness, of the utmost importance, for it serves for orientation, than which nothing in wisdom or in life can be more important. Obviously a fair knowledge of the rough anatomy of a plant or an animal or even of comparative anatomy is possible to one who is no histologist. Should an histologist deny the possibility, he would do so because he is an histologist. Physics, chemistry, botany, zoology are interdependent; a good deal of knowledge of the whole they constitute is possible to one who is no authority in all or even in one of the great constituents. The indication is sufficiently clear; there is a sense and a measure—an important sense and measure—in which one may gain wisdom about civilization as a whole without achieving mastery, authority, expertness in all or in any one of its more momentous enterprises.

How may such a course of instruction be

made to serve its purpose? How is it to be administered? One may be tempted to say: by lectures, reading, writing, and discussion. But these words leave the question essentially unanswered. The giving and hearing of many lectures, much reading, much writing, much discussion may, sometimes they do, result in producing, not intelligence, not wisdom, but only gas, gas, infinite gas. Precious things in the world have been injured, and are now in danger of being destroyed, by the advancement and increasing influence of "theories" and "doctrines" invented and advocated by men and women who have heard many lectures, have read much, talk volubly, write voluminously, love discussion; who do not know the difference between clarity and unclarity; who, not knowing what clear ideas are, neither have them nor desire to have them; who deal constantly with great, vague, undefined, often indefinable, terms without knowing or desiring to know that such is the case; who muddle these into the shape of statements devoid of definite meaning; and who, having produced a series of them without coherence or any connection save only such as

time, space, and emotion compel, go confidently forth with the smeary amorphous mess, passionately proclaiming it a holy message for saving the world. The unwisdom of such "doctrines" is, of course, due to the unwisdom of their inventors and advocates. Fundamentally the difficulty may not be cultural; it may be physiological or anatomic. But in any case—and this is the point—the evil persists and grows despite much hearing of lectures, much reading, much writing, and much discussion. These things are undoubtedly *necessary,* but they are infinitely far from *sufficient.* They are worse than worthless unless they be pervaded with the sobering, purifying spirit of rigorous criticism.

The art of such criticism is not easy to acquire nor easy to practice, the spirit of it being a somewhat rarer thing than enthusiasm. It may be worth while to remind ourselves of some of its essential tasks, to reflect a little upon a few of its fundamental functions. Primary among these is recognition and understanding of the fact that any great subject, whatever stage of development it may have reached, involves two widely different vari-

eties of matter and demands consideration of them both: a variety in which it is possible to form clear or exact or well-defined ideas or concepts—let them be called precise; and a second variety—not less important than the first but often more important and more pressing—in which such precision, however desirable, cannot be attained. Failure in respect of this broad distinction is failure at the source; it leaves wide open the way to every manner of confusion and is certain to frustrate the main purpose of all serious thinking, which is enlightenment. To recognize the principle in the abstract, which is easy, is not enough; the principle must be continually applied, now to the various subjects of a group and now to the diverse aspects of one subject; and that is not easy, for it demands that, whenever new matter comes into view, the question must recur: which of the two varieties does the matter belong to? Is it the kind that admits of being handled by means of precise concepts, or is it the other kind? The constant exercise of such discrimination must beget and foster a sense for clarity, and not only a sense for it, but—what is even more important—a craving

for it because a genuine desire for clarity is essential to intellectual integrity, without which a mind is diseased, ethically unsound, and is, besides, if it be a powerful mind, a social menace.

Where precision is attainable, criticism demands precision: first, precision of ideas—a passion for it, ability to attain it, its actual attainment; second, propositional precision—a passion for definiteness of statement, ability to form definite statements, their actual formulation; finally, logical precision—reverence for the eternal laws of coherent thinking, ability to concatenate or organize logically combinable propositions into an autonomous doctrine, the actual construction of such doctrines. Unless criticism contrives to accomplish these ends, it fails. Yet the accomplishment of these is not its most difficult task.

The most difficult task of criticism arises in connection with the other sort of matter—opinionable matter—the sort which does not admit of being treated by the methods of precision. It is just this variety of matter that human beings, whether they be students or men and women of practical affairs, are most

commonly forced to deal with. It is not their fault that they are constrained in dealing with it to employ terms that are vague, undefined, indefinable; the fault inheres in the matter itself. How is such subject-matter to be rightly treated? Every one who knows what logic is knows that the treatment in question cannot proceed in strict accordance with the rigorous demands of logic. The processes of logic are available when and only when all the terms employed—except a few that must be consciously assumed—are sharply and completely defined, and when, accordingly, the propositions to be handled are free from ambiguity, admitting one interpretation and only one.

How, then, I repeat the question, is opinionable matter—the greater bulk of the matter of human discourse—to be dealt with? It is a little strange that the theory of discourse contains no technical name for the ideal in question. Yet the ideal exists. In describing it we must be content with the homely statement that opinionable matter is to be treated in accordance with good judgment, in accordance with good sense, in accordance with sanity.

Not unattainable precision of ideas or propositions, not unattainable logical rigor, but sanity, good sense, good judgment in thought and discourse about opinionable matter—these are the things which it is the function of criticism, in this its most important field, to foster and guard. How is the function to be performed?

The importance of desiring to know, and of knowing, whether given matter is of the opinionable variety or not has been already emphasized. It is equally important to distinguish between the definite and the unmistakable. An idea may be perfectly definite and yet be mistakable, easy to confuse with other notions. On the other hand, and this is what requires to be signalized, an idea may be far from definite and yet be or be made to be, in respect to the core and burden of its meaning, quite unmistakable. The central more momentous significance of many a great undefined and indefinable term—justice, for example, poetry, philosophy, religion, democracy, righteousness, liberty, to name only a few such terms—may be rendered quite as unmistakable as may be the presence of a mountain

mass whose remoter outlines are enveloped in mist. To promote the approximate determination of such centers of spiritual gravity is so weighty an obligation of criticism in dealing with opinionable matter that its importance cannot be overestimated. To the keeping of the obligation fullness of knowledge is a necessity too obvious to insist upon. Hardly less obvious is the necessity of submitting the great terms involved to the most patient and searching analysis without any expectation that precise definition, available for strictly logical use, can be thus or otherwise arrived at; and it is evident that all the processes of serious dialectic must have free play. That is much, but is it all? Are the offices of such analysis and dialectic confined to evaluating the meanings of opinionable terms? Far from it. For in addition to the task of evaluating the meanings of opinionable *terms* there is the more difficult task of rightly constructing and rightly interpreting *propositions* involving such terms, the yet more formidable task of rightly constructing and rightly interpreting *doctrines* composed of such propositions, and finally, the supreme task of rightly estimating

the relative merits of competing doctrines. A little reflection is enough to show that the office of analysis and dialectic in relation to these additional tasks is too complex and manifold to be disclosed or even described in a few words. Nevertheless, criticism must contrive to perform the office, for else those who may naturally be supposed by themselves or others to have been inducted into the new wisdom will have gained but little, if any, more than the vocabulary of knowledge without its content; their wisdom will be phraseological wisdom; and a Socrates will be needed on every corner to show the young men and women that they know nothing and—what is worse—that they do not know that.

Of course it is not to be supposed that genuine wisdom can result, in all cases, from even the most competent instruction, for it must not be forgotten that wisdom is a thing which some are *pathologically* incompetent to receive or win. The maintenance and advancement of wisdom in the world involves a perpetual conflict between sanity and insanity. The hope of wisdom lies not so much in any superiority of numbers as in the fact that in

cooperation there is strength, and that the sane, just because they are sane, can cooperate better than the others.

It need hardly be said that the object of instruction designed to yield the new wisdom about the world is not that of teaching a creed, whether religious, political, or social. The aim is to give a certain large intelligence—imagination, sympathy, understanding—and, above all, independence of judgment in world affairs. Teaching that aims at securing independence of judgment is incompatible with teaching a creed. This does not mean that a creed or creeds may not be arrived at, certainly not; it means that an instructor, if he becomes a propagandist, ceases to be a teacher of the new wisdom.

SCIENCE AND SUPERSTITION

It is commonly believed that science and superstition are essentially incompatible. The belief is erroneous.

Science and superstition are one—one in origin, content, and aim. They are the offspring of intellectual curiosity, of wonder, as Aristotle said, of the desire to account for, to explain, to understand, to know.

The superstition of today is the science of yesterday. The science of today is the superstition of tomorrow. The progress of science consists in improving the superstition of the world. I am scientific if I try to facilitate the process; superstitious, if I do not.

Is it, then, true that all existing science—the modern scientific theory of relativity, for example—is destined to become myth? Yes, for the law is:

"The present is no more exempt from the sneer of the future than the past has been."

Is the law disheartening? On the contrary,

were it not for the endless progressibility of science, were it not for the endless improvability of superstition, though life would be possible, human life would not.

A SHORT SEASON OF SUBSTITUTES FOR BRIDGE

A GAME is a great game, just as a subject of thought is a great subject, if many worthy people think it is; otherwise, it is not. A little reflection suffices to show that there is, ultimately, no other test, and so the proposition need not be argued.

It follows that Bridge is a great game.

The game is an art. Some people think it is also a science. In this they are mistaken for, as the late Henri Poincaré repeatedly said, there can be no science of a given subject-matter which does not involve an infinite number of possibilities—an infinitude of potential phenomena. In Bridge, however, the number of possibilities—the number of possible combinations, sequences, plays—is finite. I have cited the saying of Poincaré because, in addition to being a profound philosopher, he was, by common consent, the greatest scientific man of his time and one of the greatest of all time.

Though Bridge is not a branch of science and never can be, yet the number of possibilities involved in it, though finite, is very great. On this account the game has the signal merit of *resembling* a science, as nearly perhaps as anything can in which many good people are ever likely to become genuinely interested.

It is very fortunate, I think, that an amusement which is so popular has so many attractive qualities, just as it is fortunate that in regions where people travel about on skees there occurs every year a long winter with heavy snow fall, and just as it is fortunate that in a world like ours where so many animals travel only by swimming there is nearly always an abundant supply of water.

Every kind of excellence, however, is better for being restrained. Excess of a virtue makes it a vice as when, for example, courage passes into rashness, or modesty into humility, or liberality into extravagance. Even the virtue of restraint requires to be restrained. For, if a virtue be too much restrained, it becomes a vice by defect, as when, for example, courage passes into cowardice, or modesty into vanity, or liberality into niggardliness. Perhaps no

other kind of excess is so damaging to excellence in general as exclusive specialization in some particular variety of excellence, overemphasizing its special merit, living for it as if there were no rival virtues, no competing goods, nothing else worth while. Mathematics, for example, is a noble pursuit but a man or a woman who has never thought of anything else is apt to be a bore.

Bridge, I have said, is a great game—at once an art and something which, though it is not a branch of science, has a pleasing semblance of one. Specialization in it, however, seems to be the kind of excess that transforms a virtue into a vice. Certainly it is safe to say that exclusive addiction to the game or even intense devotion to it renders impossible a rotund development of personality. But who, it may be asked, desires such a development? All those desire it, I believe, who distinguish between person and personality.

A very great majority of men and women are obliged to work a great deal to earn the means of living. Yet all, or nearly all, have some leisure. How may it be used most wisely? The other day a learned psychologist an-

swered the question by saying that one should divide one's spare time into two equal portions, giving one of the portions to Bridge and the other to reading and meditation upon some great subject. Is the answer a wise one? I doubt it for two reasons. One of them is that to pass too suddenly (so as to waste no precious time) from the spiritual mood proper to Bridge to the mood essential to profound meditation, or *vice versa,* involves a degree of violence not to be recommended upon physiological or hygienic grounds. The other reason is that the psychologist's advice conflicts with the soundest of all ethical principles, the fine principle so often reiterated by the best thinkers of ancient Greece—*meden agan*—nothing in excess—, for it is evident that a daily swing-swang between playing at a *great* game and thinking upon a *great* subject involves an excess of the virtue of greatness, a kind of intemperance that, if persisted in, is certain to produce a very dreadful disorder—Chronic Grandiosis.

It is, of course, well known that Bridge addicts, if not too far gone, can be relieved in a measure by such familiar remedies as fiction,

the cross-word puzzle, the opera, the theater, the 'movie,' and kindred means. These, however, are not so much curative as palliative and prophylactic. To all of them, moreover, there is one serious objection: intellectually they are too drastic, draining off, I mean, and absorbing much fine energy that ought to be reserved for the great game or some great theme.

After much pondering of the matter I have become convinced that what is needed is a new variety of amusements—amusements that are neither silly nor too solemn, neither too soft nor too solid, neither trivial nor awfully grave, neither too easy nor too hard, adapted to all sexes and all grades of intelligence,—amusements that enlighten while they beguile and charm, tend to restore conversation as a social art, recognize the existence of a little gray matter in the human brain, and would be universal in their appeal if everybody liked them.

From what has been said it will be seen, I hope, that the several items listed below have been suggested by a fairly wide variety of cultural considerations, some of them esthetic,

some of them ethical, some of them hygienic, and some of them slightly tinged with intellectual quality.

Upon a little examination of the list a hostess or host will see that any one of the items is alone big enough for an entire season of weekly or monthly meetings. Yet as an initial experiment it would be better, I believe, to cover the entire list or most of it in a single season. Each item will probably require two meetings. At the first of them some competent person, selected in advance by the hostess or host, will explain clearly the central or main idea of the chosen item. At the second meeting each of the guests will be expected to make a double contribution by presenting a brief report designed to exemplify the main idea and by participating in the discussion which the reports will evoke.

Let me add that I do not intend to recommend the items nor, strictly speaking, to propose or even to submit them. I am content with merely suggesting them for the use or abuse of any who may be wise enough (or foolish enough) to give them a fair trial.

Pseudo-questions

Two meetings devoted to this item would doubtless yield far more than double the profit to be derived from only one—profit, I mean, in the way of fun and enlightenment. The present volume contains a short essay entitled, *Hard to Ask Questions.* In it I have stated what is meant by a pseudo-question, clarified the definition by a fairly wide range of examples, and signalized both the frequent difficulty and the very great importance of distinguishing between pseudo-questions and questions. The essay might perhaps be used as a basis for the initial meeting.

In making a program for the second meeting the only difficulty would be that of an embarrassment of riches. Selection would be necessary. Whatever else the program might contain, it should, I think, call for two brief reports from each of the guests. One of the reports would present one or more instances of pseudo-questions found in the respective literatures of religion, theology, ethics, sociology, psychology, philosophy, science, mathematics, politics, jurisprudence, and so on. The

other report would be upon the topic: Some Pseudo-questions Which I Formerly Mistook for Questions.

Among other themes that would be available for the second program, did time allow for them, the following may be suggested:

Criteria for determining whether a seeming question is genuine or spurious—a question, that is, or a pseudo-question.

Some seeming questions respecting which I (the speaker) am in doubt whether they are questions or pseudo-questions.

Pseudo-questions asked by children, by grown-ups, by the illiterate, by the literate, by knaves, by fools, by philosophers.

Ancient, medieval, and modern pseudo-questions.

Comparison of Oriental pseudo-questions with pseudo-questions of the West.

Pseudo-questions that have been responsible for many manifestations of nearly every kind of civilized savagery—myths, superstitions, sacred books, schools of philosophy, incredible, lying, insolent creeds, inquisitions, personal quarrels, sectarian

hates, national and international disputes and war.

To any one with imagination additional themes will readily occur. But those mentioned make it evident, I believe, that *Pseudo-questions* is an item fertile enough, not merely for two meetings, but for an entire season of them, were some hostess and her friends inclined to so much gaiety of a single type. And the like may be said of the next item.

Postulates

or

What We Take for Granted

It is well worth while to enter the vestibule of this subject and look about a little even if one is never to explore the temple itself. For the subject is immense, fundamental and immeasurably important for every one without exception. And it is replete with surprises and delights. To gain at least a speaking acquaintance with it two meetings should suffice, especially if the hostess and her guests have

once had some geometric instruction however slight or long ago, though such instruction is not strictly necessary. Education, which birth begins and nothing but death should terminate, is the process of becoming *aware*. The process, if it runs a prosperous course, will be marked by certain crises. None of these is more important than the one which consists in becoming clearly aware of the fact that in all of our human thinking, in all of our discourse, formal or informal, spoken or written, in all of our planning, organizing and conducting of affairs and institutions, we continually use various propositions which, whether they be true or false, we take for granted.

Were my relation to the reader that of a pedagogue to a pupil, I should request the latter to read the preceding sentence again and to ponder it but to make such a request in this essay would be impolite and I refrain from making it. The crisis in question may be likened to a second birth—it marks the transition from the estate of a merely vegetative 'mind' to that of a Critic. In the case of a few gifted or wisely educated people the crisis occurs at an early stage; unfortunately, in the

case of a vast majority of mankind it does not occur at all.

It is one thing to be aware of the fact that we are always, as said, taking propositions for granted but it is a very different thing to know and be able to tell what the propositions are which, in a given connection or upon a given occasion, we or others are taking for granted. If we are considering or discussing some subject, religion, for example, or education or prohibition or socialism or evolution or fundamentalism, no matter what, and some one asks us whether we are not taking certain propositions for granted, we may be wise enough to answer yes; and if we are then requested to state the propositions we are taking for granted, we may be quite unable to do so. Is this inability disgraceful? No; but it ought to be and would be if it were not so common.

Propositions that are taken for granted in any given discourse, whether it be spoken or written or inarticulate as in silent meditation or thinking, are called the *postulates* (or assumptions or axioms) of that discourse. Although we are continually using postulates we are, as already said, seldom aware of the fact;

and even when we are aware of it, we seldom know, because we have not tried to ascertain, what the particular postulates are that, in a given instance, we are actually using. To ask whether it is important to know what they are is like asking whether it is important to be intelligent. Detection of postulates, whether in one's own discourse or in that of others, is an essential part of the daily activity of an alert and emancipated mind. Postulate detection is indeed a general kind of psychoanalysis, indicated no less for the "sane" than for the "insane."

Such, in rough outline, are the matters which it should be the aim of the first meeting to make clear. The task of the mentor selected for the occasion would perhaps be somewhat facilitated were the hostess and her guests to read with some attention a booklet entitled *Thinking about Thinking,*[1] especially the final chapter, "Detection of Postulates," where I have tried to make the matters here in question and kindred ones entirely clear. The little book, I think, is pretty dry, as dry as pemmican; pemmican, you know, is very nourish-

[1] E. P. Dutton and Company, New York.

ing and it is palatable, too, but it has to be chewed.

For a second session what should the program be? Here again the sole difficulty is an embarrassment of riches. Unless the guests were too numerous each of them might be requested to make two brief reports. Each guest should be able and willing to present a list of the postulates commonly employed consciously or unconsciously in typical discussions of some topic of general interest—communism, for example, or capitalism or fundamentalism or evolution or democracy or prohibition, and so on—or a list of postulates consciously or unconsciously employed by representative workers in some field of science or philosophy or mathematics or ethics or jurisprudence or education or theology or medicine or religion, and so on. According to their interests and tastes two or more of the guests or even all of them might deal with a same topic or field. Some such concentration of the reports is to be recommended as favorable to profitable discussion following them.

I cannot think of a better topic for the second report than this one:

Postulates that I used to employ unconsciously: some of them false, some of them probably true, some of them questionable.

For such as may desire to pursue the general subject further the following miscellaneous themes may be suggested:

The political postulates found in the American Declaration of Independence.

The rôle of postulates in mathematics.

Postulates in or underlying the Sermon on the Mount.

Postulates employed in some branch of modern science, in Biology, say, or in the relativity and quantum theories of Physics.

Criticism of the postulates consciously or unconsciously employed by parents, churches and states in the education of children.

Wholesome and vicious postulates underlying social customs and conventions, rules of conduct, ethical and religious codes, commandments and taboos.

Comparison and criticism of the postulates involved in the public utterances of Lenin, Mussolini, W. J. Bryan, Theodore Roosevelt and Woodrow Wilson.

The postulates of Mysticism.

The postulates involved in the average man-in-the-street's "philosophy" of life.

Postulates underlying the theory and practice of Psychoanalysis or Psychiatry.

Famous postulates whose discovery resulted in their modification or abandonment.

The effect of postulate detection upon personal enlightenment, the advancement of knowledge, the spirit and practice of tolerance, and good will in the world.

An evening's conversation upon any one of the foregoing themes would convince the participants that it is quite big enough for a volume.

When I began this essay it was my intention to include in it, in addition to the two items already presented, the following ones:

Sense and Non-Sense

The Logic of Love and the Love of Logic

Relations Both Sexual and Asexual

Objectified Abstractions
Natural and Supernatural Gods
Relative Things and Things Absolute
Theological Infinity and Scientific Infinity.

But I have changed my mind for several reasons: one of them is that I have already fulfilled the promise implied in the essay's title; another one is that the essay is now long enough and tends to become heavy; a third one is that this is a hot humid afternoon of late August and I am a bit weary; finally, I have not the fine moral zeal of one who could aspire to be an inventor or a censor or a director or a reformer of other people's amusements and recreations. Suppose I do think that these are often unworthy—excessive or defective or stupid or vacuous or even insane. What of it? I think the same of my own.

STYLE

WHEN I was a very young man Herbert Spencer was in great vogue, so much so that people who did not know what the great thinker had said upon any given subject, and he wrote upon nearly all subjects, were not regarded as being in touch with the best thought of the time.

One day a friend of mine who had a pretty strong scientific bent—he had just been graduated as a doctor of medicine—noticed that in a published list of Spencer's writings there was a work entitled *The Philosophy of Style.* Not only was the young physician an enthusiastic admirer of Spencerian philosophy but he was also very fond of fine clothes. So he somewhat excitedly drew my attention to the title, said he must have the work, and ordered a copy of it immediately. Fancy his disappointment when, upon receiving the essay, he found that the "Style" it dealt with was *literary* style. Declining to read it, he

tossed it to me, saying: "Keep it or throw it away—I don't want the thing."

Well, I read it with much interest, more than once. That was more than two score years ago. I now recall (accurately I believe) only one of its statements—the main thesis of the work. The thesis is *"That style is most excellent which yields its contained idea with the least expenditure of mental power."*

The least expenditure by the reader or hearer, not by the writer or speaker, is what is meant, of course; pardon the explanation—Spencer, it is said, was without a sense of humor.

The dictum of the cosmic-minded Englishman agrees with the familiar saying of the cosmic-minded Aristotle, that clearness is the first quality of style.

Clarity, however, is not favorable to fame. For clarity makes for understanding but most readers do not really desire to understand, they desire to be mystified: they crave a sense of the intimate presence of something too vast and deep for clear utterance. Make a list of ten or a dozen of the most famous teachers in the history of the world. If you study them,

you will find that it is their dark sayings, not the things they said clearly, that mankind have found to be sweet. Long after writing the preceding sentence I encountered these words of Anatole France:

"Humanity is hardly ever passionately attracted by works of art or poetry which are not in some part or degree obscure and capable of various interpretations."

MAN AND MEN[1]

AT the outset I desire to say something about the title of the lecture course that has been established under the leadership of our good friend, Dr. Metcalf, and is being supported and sustained by the means and presence and discussions of business folk including the men and women who are here tonight.

The title of the course is *Linking Science with Industry*. It is very suggestive. It indicates in the first place that hard-headed business men are beginning to be interested in scientific things. That is a good omen. And so this enterprise of yours, if I understand it aright, is facing in the right direction. But it has far to go, for, to say nothing of the *ideal* community of scientific-minded people, it

[1] This article is in the main identical with the official stenographic report of an address, January 4, 1924, at the Bureau of Personnel Administration, 17 West 27th Street, New York. One of a symposium of addresses edited by Dr. H. C. Metcalf and published in a volume, *Linking Science and Industry*, by The Williams and Wilkins Company.

must be said that, in comparison with some other civilized countries, our country, the United States of America, has a very small population interested in Science, a very small citizenship who know, or desire to know, or try to ascertain, what science is, what the spirit of science is, what scientific method is, what has been the history and development of scientific ideas, and what the potence of science is for the advancement of man in all the directions of well-being. "In comparison" I have said. Let me make my meaning quite clear.

About two years ago there was published in France, in the French language, a book by Nordman, Astronomer in the Observatory of Paris. The title of the book is *Einstein and the Universe.* It could not be supposed, I think, from the title, that the reading of that book was likely to contribute immediately to the reader's *material* welfare. Yet within five days ten thousand copies of the book were sold in France. If that had happened in this our land, would you not feel a bit proud of the fact? Comparing the wealth and population of this country with the wealth and popu-

lation of France, how many copies of such a book ought to be bought here in five days? Certainly not fewer than 50,000 copies. I will leave it to you to answer the question whether any man or woman could write a solid scientific work on any subject so seemingly remote from the lust for material gain and reasonably hope to sell to you and your fellow citizens, I will not say 50,000 copies of it in five days, but 5,000 copies in five years.

Some of you will remember that a few years ago—I have forgotten just how many—a popular vote was taken in France to ascertain who among the eminent men of that country was the people's hero, and you will recall perhaps who it was that was elected to that high distinction. It was Louis Pasteur, a great man of *Science*. Contrast the popular intelligence thus made manifest with the popular intelligence indicated by the following episode.

A few months ago a gentleman living in this metropolis wrote for a popular magazine having an immense and widely distributed circulation an article that one can read in thirty minutes, in order to enlighten the general public with an answer to the question: Who are

the seven greatest thinkers that our country has produced? For that precious contribution the writer received, I am told, one thousand dollars. Did the article name among "the seven greatest thinkers" a man of science? No. Why not? The reason doubtless is that the writer, though he had the sort of mind that could compose the kind of article for which that magazine, because of its enormous circulation, could afford to pay a thousand dollars, did not know enough about science or scientific men to select such a man. Did the writer's big public protest against the omission so flagrant and grotesque? No. Why not? Because their innocence of science is like his own. Yet if the writer of this thousand-dollar article had known enough to name a scientific man, say Willard Gibbs, he would have named a man who for his researches and publications received not one cent.

Do you marvel when I say, in view of such considerations, that, though your enterprise enlisting the interest of hardheaded business men in scientific matters is facing in the right direction, it has very far to go?

Let me draw your attention to further con-

siderations teaching the same lesson and confirming what has been said.

Our country has produced important scientific men and these have done important scientific work in spite of the low level of scientific interest and scientific intelligence in our general citizenship. In astronomy, for example, it is a fact, conceded (I believe) throughout the world, that America has been the leader for more than a generation. In the field of my own subject there is the American Mathematical Society of more than a thousand members that publishes two journals devoted to mathematical research. There, too, is the Mathematical Association of America, which has a yet larger membership and publishes one journal. There is a large American Society of Physicists, an immense American Society of Chemists, and so on for the other divisions of science. I have not named the American Association for the Advancement of Science, embracing all the branches that the scientific activity of our time has developed.

You are business men. You are representatives of industry in the wealthiest nation of the world. Have you a genuine feeling of pride

in our American societies of scientific workers? Have you an intelligent conception of your indebtedness to their activity? Have you tried to discharge your obligations in the matter?

Who are the men and women that constitute the membership of those societies? They are nearly all of them college and university professors. They are men and women of such small incomes that they are hardly able to support themselves and their families decently —*in the wealthiest nation on the globe.* Much of their time and energy is given to teaching the rudiments of science to college and university students—to your own and your neighbor's children. The remnants of their time and energy are devoted to research.

The results of their researches are published in the various appropriate technical journals. For their scientific contributions the authors receive how much material compensation? Not one cent. They literally *donate* these to the world. They do not desire to receive pay for them. I believe it is better that they do not but I am pointing out, for you ought to know, that they do not receive a cent

—no chemist, no astronomer, no geologist, no physicist, no biologist, no mathematician receives a cent for an article published in a scientific journal. Why ought you to know that and to meditate upon it? Because it is those scientific contributions that increase the world's light—your light and mine.

And there is another thing that you ought to know. How are the scientific journals—those sources of your light, your convenience and your power—supported? How are they paid for? The answer ought to make some captains of industry blush with shame. Those journals are supported out of the slender means of the very men whose researches are published in them.

That being so, you can hardly be surprised when I tell you what the situation is today. What is it? It is that, owing to the high cost of material and labor, some of our American scientific societies are unable to support properly their scientific journals. And so many a scientific article of value must either be rejected or else wait two or three or more years before it can be published at all, because prompt publication of all articles that are

worthy of publication would cost the appropriate societies more than they have the means of paying. Just now the American Mathematical Society is compelled by poverty to have its printing done in central Europe, and the articles are sent abroad and the proofs returned to be read here and then sent back.

I can not think of a better way to "link science with industry" than to link industry with science. And surely there can be no better way to do this than for representatives of Industry to furnish representatives of Science—scientific men and their organizations—adequate means for publishing and distributing their works for the nation's good and the world's.

At present the American Mathematical Society is in the most urgent need of an endowment of $100,000 to enable it to continue and develop its great work. Were some sagacious promoter of industry to establish such an endowment, the effect would be to benefit his country immeasurably and at the same time immortalize the benefactor's name.

Well, I find the suggestiveness of your lecture course's title greater than I had thought

at first. Perhaps you will allow me a further word upon it.

Science and industry are already linked in a very impressive and intimate way. This age, we say, is an industrial age. It is significant that it is also a scientific age. An age might be scientific without being notably industrial. But an age could not be industrial unless it were also a scientific age or one preceded by such an age. For science is one thing but the applications of science constitute another. One could hardly be so stupid as not to see that the great development of industry here and elsewhere is in the main due directly or indirectly to the applications of science. Do but think for a moment about the matter. Were I to tell the truth about industry's dependence upon the applications of my own subject, you would probably think I was exaggerating through pride. But I must yet tell the truth, summarily, and it is this: *If by touching a button on yonder wall I could suddenly annul all the contributions that mathematical applications have made to our modern material civilization, then I could thus make the whole vast fabric of that civilization collapse like a*

house of cards. I am not going to argue that for you can not reflect without seeing for yourself that it is true. Without application of the science of astronomy you could have no calendar, the clocks of the world could not be adjusted, nor would it be possible to navigate the seas. It would be almost insolent were I to emphasize before this audience the dependence of industry upon physical, chemical and mechanical applications. Industry is an offspring of science—it owes its being and developments to the applications of science. But industry is not science. And I want to emphasize that difference very strongly.

Some things in this world are self-justified; and other things, if they may be justified at all, can be justified by nothing save their extraneous effects. Science is one of the things that are self-justified; for the aim of science is to understand, to understand the universe, which includes mankind, and *understanding* is in itself a thing so immediately precious that it does not require to be defended. One who does not know the high pure joy of sheer understanding has either never come into a sense of his human birthright or has lost it.

But the applications of science are not self-justified. Industry, which has resulted from such applications, is not self-justified. I wonder how many there are in this audience who are *convinced* that Industry—that vast modern development of what people call industry —is self-justified. Of course you cannot be "convinced" of it unless you have seriously doubted it; for a conviction is not a mere state of mind—you can not have a conviction unless you win it, and such winning, in a matter that admits of doubt, is far from easy. I have been told—I do not know how truly but, whether truly or not, the point is the same—that the government of one of the powerful nations is causing its men of science to concentrate upon the study of bacteriology with a view to winning the next world war by bacteriological poisoning. That would be an application of science but it would be utterly damnable. I need not multiply instances. They will leap to your minds at once.

Industry is not self-justified. It must plead some excuse for its noisy activity. How is it to be justified if it admits of justification? We are not likely, I think, to disagree in the an-

swer. The answer is: *If industry is to be justified, it must win justification by enabling the communities in which it flourishes to live a good life.* Else it fails and must be condemned —there is no alternative and no escape. And so we must ask: What are the self-justified things that, being lived, constitute a "good life"? I am going to name just four of them, very comprehensive ones, which you will find mentioned and discussed in a thought-provoking article by Mr. Bertrand Russell in the *Dial,* August, 1923.

One of them is *instinctive happiness.* Most of the "happiness" of our modern industrial life is artificial, non-instinctive, unnatural, ungenuine. What is meant by instinctive happiness? A few hints must suffice for the answer. The touch of the ground, the smell of the gentle rain, the sight of the gray rock, the great blue skies, running streams, floating clouds, the beauties of the land and the sea—these suggest what is meant by instinctive happiness.

Another of the self-justified elements of a good life is *friendliness*—friendliness with the members of your family, friendliness with

your neighbors, friendliness with the people of your state, friendliness with the people of the world.

The third is *art:* a community, other things being equal, has a good life in proportion as it develops the capacity for producing and for appreciating art.

And the fourth is *pure science;* other things being equal, a community has a good life in proportion as it develops the capacity for producing and for appreciating pure science. The term 'pure science,' as I may say in passing, is tautological. Pure science is simply science; there are applications of science but no such thing as 'applied science.'

Our general theme is: *Linking Science with Industry.* My thesis, if I may repeat it in another form, is this: Science is self-justified; industry is not; the former is to be so linked with the latter that industry shall lead to good human life in this world, not goody-goody life, but good life. In other words, the problem of linking science with industry is the problem of making industry serve mankind. Other justification industry has none.

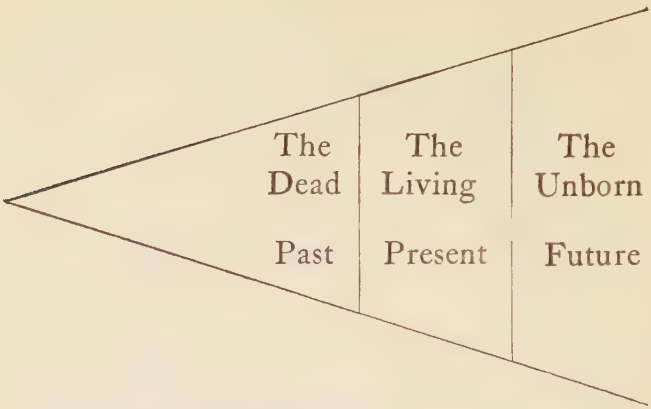
That is the introduction to my lecture. I

fear you may think I have not been discussing my subject. Well, I have been, implicitly. And now I shall take a few minutes, if I may, to discuss it explicitly.

I chose this subject—*Man and Men*—because I desired to discuss with you the most important subject that I or you or any one else could think of. There are many realities in our world but they differ much in dignity or rank. Of all the realities with which you and I have to deal, with which it is our privilege and obligation to deal, the supreme one is not matter nor material energy nor space nor time, though the importance of these is very great. The supreme reality is Man. The supreme concrete realities of our world are individual men and women. The supreme abstract reality of the world is Man, the race—Humanity. What do I mean by that term? I mean, I suppose, what you mean. By humanity I mean all mankind, not merely the living, but the dead, the living, and the unborn. By humanity I mean, to answer abstractly, those things—those propensities and powers—in virtue of which humans are *human*. Have you ever considered what those propensities and

powers are? I shall not pause here, for it would detain us too long, to name them and analyze them. Being humans, you have them in some measure. As *intelligent* humans, interested to understand your own nature, you are bound to ascertain what they are, if you can. And you can, if you will. There is a book that will help you. I mean Count Korzybski's *Manhood of Humanity,* a work that every man and every woman, no matter what their occupations or stations, ought to read open-mindedly, reread and ponder. With its central ideal I have dealt briefly in a chapter of my *Mathematical Philosophy* but the reading of that chapter is far from sufficient.

In the remaining minutes of the hour I wish to say a few things, by way of opening up an immense subject, about the relations of individual human beings to humanity. I can hardly do more than drive into the wall rather rudely a few wooden pegs to which you may think it desirable to attach some reading and reflection in the future. I am tempted to make a little diagram. I should make it larger but the board is too small.



The mid-part represents the Present, occupied by the existing people of the world. On the left is our human Past, tenanted by the dead, a long backward stretch, perhaps a half-million years. On the right is the wide strange Future, mysterious realm of the unborn. Humanity embraces the three—the Past, the Present, the Future—the dead, the living, the unborn. Today you and I are among the living. Yesterday we were unborn. Tomorrow our bodies will have perished. In each estate we are members of Humanity—representatives, as W. K. Clifford might have said, of "Father Man."

It is the fortune of the living to have to

deal with what we are wont to call "the problems of the world." Of these the so-called industrial problems, in which you are especially interested, are only some of the elements or aspects. All the problems are primarily human problems, problems about humans for humans to solve, and no such problem exists alone or admits of a lone solution. Each of them is in a net-work involving all the others. In this matter the mystic's contention is true—each is all and all is each.

Our present problems involve the past and the future: the problems of the living involve the dead and unborn. It requires no special wisdom to see that—it rather requires the special innocence of a fool not to see it.

I have no single formula for the solution of all your industrial problems, much less have I one for solving all the problems of our troubled modern world. But it is my conviction that the chief source of trouble is this: *We have been and are living in the midst of a great civilization like maggots in a cheese.*

We are living immersed in a Civilization which, despite all its short-comings, is so vast and rich and manifold that we can not meas-

ure its proportions nor assess its worth. And the industrial troubles of today and all the other social troubles of the world will be found, if we view them fundamentally, to have their *roots* in the fact that we have been living and are still living in and upon that civilization, without just thought of our relations to it, without a sense of our indebtedness and obligations, like maggots in a cheese.

And so the best formula I can think of for dealing with the human problems of the world is this: *Stop living in the midst of our great modern civilization as maggots live in a cheese.*

How is that to be done? The first means thereto is to study civilization—its origin, its genesis, its nature, our human relations to it and our obligations.

Where did our civilization come from? Let me intimate the answer by an example.

Some months ago I was teaching a class in the Calculus. The boys were dealing with problems in maxima and minima. Some of you know, as I perceive, and some of you do not know what those words mean, but all of you will understand what I am about to say.

We had one hour. The boys finished in forty-five minutes. "Boys," I said, "please be seated. I want to say something that is more important than the Calculus.

"You and I are probably quite ordinary people. It may be that some one among you is extraordinary but, if so, the happy fact has not yet been demonstrated. Let us, then, assume that our native gifts are ordinary. Yet you have just now readily solved problems of a kind that the greatest genius that has ever lived on our planet could not solve without the instrument you have employed—an instrument you have been getting acquainted with during the last few weeks, namely, the Calculus. Where did it come from?"

"It was invented by Newton," said one of the boys. Another said, "it was invented by Leibniz."

I said: "Boys, both of those answers are commonly given and in a sense they are correct. But in a deeper sense both of them are false because Newton and Leibniz did but improve the mathematics of their immediate predecessors, and these predecessors did but improve the mathematics of *their* predeces-

sors, and so on back till you come down here somewhere in this sharp angle of our diagram where our dear remote ancestors are struggling to learn to count. The Calculus was invented back there ages ago—I mean it started there. And so the Calculus was not created by Newton or Leibniz. It was produced, little by little, by many generations now in the state of those we are accustomed to call the dead."

And I said: "Boys, they are not dead—that must be evident to you. Their bodies are dead but the men are living and are here in this room—Newton and Leibniz and the rest are here—they are at work, working *with* us and *through* us as agents of humanity, by means of ideas which they invented, which we inherited and which it is our privilege as humans, and our obligation, to use, to improve, and to transmit. I say 'transmit,' for the unborn are coming—if you will go to your cloister and meditate in the silence, you can see them approach, generation after generation of them, fellow-children with us of Father Man—they look to you and me and appeal to us as the present occupants and guardians of their future home, for the kind of world they will find de-

pends upon our loyalty as representatives of Humanity."

I have used the Calculus, my friends, merely as an illustration. The Calculus is but one element of our Civilization. What I have said of the Calculus is true of all the other elements—speech, the arts, the sciences, the inventions, the great literatures, the wisdoms of philosophy and of law, the ways of social organization and order, and all the other kinds and forms of material and spiritual wealth. We, the people of this generation, whose physical bodies are still living, were born in the midst of a great civilization. We may have improved it a little in some respects but we did not *create* it. It is of the utmost importance for us to grasp that fact and hold it and realize it keenly; for else we shall be as maggots in a cheese. Our civilization—the material and mental wealth of the world—was not produced by us. We have it as a gift. It is the fruit of the time and thought and toil of many generations of those whose bodies have indeed perished but whose spirits survive and are now active in the ideas and ideals and sentiments and aspirations embodied and

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transmitted to us in the form of instrumentalities and institutions, knowledges and arts.

We must understand and not forget that there was a time when there were no human beings on this globe. There was a time when humans began to be. We must try to realize, for it is true, that our remotest human ancestors did not know what they were nor where they were. They had no clothes nor houses—they were probably covered with hair and dwelt in caves. They had no language, no human history, not even human tradition, no knowledge of number, no guiding maxims, no tools nor craftmanship. But they had a marvelous thing—they had a gift that enabled them and impelled them to *start* what *we* call civilization; and they were, moreover, the first of a race that had another equally marvelous and equally precious gift—a gift enabling and impelling them to *advance* civilization. These are the gifts—the natural gifts—that make humans human.

And so we see that Civilization is the creature, not of men, but of Man, not of individuals singly, but of Humanity. It is to the time and thought and toil of those remote

rude ancestors, groping in the dark, and of the many generations of their successors that we are indebted for the immeasurable riches—the material and spiritual wealth—of our present world.

To receive that Human Inheritance as we habitually do receive it, taking it all for granted as we take the gifts of Physical Nature—land and light and sea and sky; not to realize, in thought and in feeling, that, though we are individuals, we are members of Humanity; not to realize in our heads and hearts and ways of living, and not to teach in home and school, our relations and obligations to the Dead and the Unborn: *that* is what I mean by living in and upon our inherited Civilization like maggots in a cheese.

But in proportion as we learn to understand and to feel those relations and obligations, we shall emancipate ourselves from the lower ideals dominant in the world and come under the sway of the higher ones. For there is a hierarchy[1] of ideals and a hierarchy of emotions begotten of them. From the power of the emotion of the ideal of self-efficiency—

[1] See Benjamin Kidd's "The Science of Power."

causing us to live and kill and die for *self;* from the power of the emotion of the tribal ideal—causing us to live and kill and die for *tribe;* from the power of the emotion of the state ideal—causing us to live and kill and die for *state:* from the domination of these we shall emancipate ourselves and more and more come under the sway of the highest of all possible ideals, the ideal of Man—causing us to live, and without killing, to die, for Humanity.

Well, what is the bearing of all this upon the right conduct of a manufacturing establishment over there in Hoboken or elsewhere? Not wishing to be insolent, I must decline to answer that question.

But, in closing, I can not refrain from indicating one application—one that is fundamental and yet so plain that even a son of Mammon could understand it if he were to try in one of those lucid intervals which occasionally visit him when his self-interest, grown weary from over-expression, relaxes a bit its regular moral pressure upon his brain.

Here is a man called a "capitalist" and here another called a "laborer." The men are quar-

reling about what they deem their "property rights." The "capitalist" says: "yonder wealth is mine for it is the product of my capital, thought and management." "No," says the other, "it is mine for I produced it by my toil." Each of them is about to fly at the other's throat. To this situation, which is world-wide, an application of our doctrine is obvious.

"My friends," one must say, "you are both of you mistaken; you are both of you making a false assumption. Neither of you produced the wealth you are quarreling about: each of you no doubt contributed somewhat to its production but it is mainly a social inheritance from the thought and time and toil of many generations of the dead. Your quarrel resembles that of maggots in a cheese."

HENRI POINCARÉ'S STYLE IN PHILOSOPHY

ONE summer day some years ago my wife and I, having gone from the noise and bustle of the city to the Zoological Garden of the Bronx for a little repose, were sitting upon a bench near a bend of the Bronx river where the stream was overarched by interlacing branches of the trees standing upon the banks. For a time there was perfect stillness; no leaf stirred; the water seemed to be asleep in the shade. Suddenly there was a flutter among the leaves, instantly followed by the swift-moving image of a bird that flung itself out from the thick foliage down upon the glassy surface of the stream, skipped upon it like a flat stone flung by some country boy, then as suddenly disappeared again among the higher branches of the trees. At the points where it struck the water the latter responded by beautiful waves reflecting light. I said to my companion:

"I wish the name and the ways of that bird were generally known for then it would be easy to describe the philosophic style of Henri Poincaré. Here and there in his 'popular' discourses he strikes now one and now another philosophic problem a sudden hard blow, without warning. The result is always a memorable flash of light. You hope in vain for the increasing glow or the steady radiance of patient exposition."

CONCEAL IT

THE next to the last time I had the good fortune to meet the late Josiah Royce, he spoke briefly of the activity in which he was then engaged. Needless to say it was not that of administrator. I had been occupied for some months with administrative tasks that made it necessary for me to forego for the time serious application to the work of scholarship. Aware of this, the eminent philosopher said:

"Keyser, what are you doing now?"

"Nothing," I said.

"Why don't you prevent it?" he asked.

"How do *you* prevent it?" I enquired.

"By proving to be incompetent," he replied.

If a college or university professor have a genuine inner call to the scholar's life and if he have in addition a gift for administration, it may be his duty to conceal the gift.

NOT QUALIFIED

SOME years ago when the presidency of the State University of Missouri became vacant by the retirement of Dr. Richard H. Jesse, an alumnus of that institution, then residing in New York City, came to see me one evening, saying that he had spoken with some fellow alumni respecting the matter of nominating a suitable person for appointment to the vacant post, that he had been commissioned by them to take up the question with me, and that, if I were willing, he would like to ask me a few questions. The conversation then ran as follows:

"If the presidency of the University of Missouri were tendered to you, would you consider the offer?" he asked.

"I certainly should," I replied, "I should 'consider' it a great honor."

"Do you like administrative work?"

I replied in the affirmative.

"Do you prefer the work of administration to that of scholarship?"

"No," I said, "I prefer the life and ways of the student and scholar. I had rather write something, if but a paragraph or only a line, that future generations would have to reckon with than to occupy any administrative office in the land."

He then asked: "Do you believe in the existence of God?"

I replied: "If I say no, I shall mean a God that you can describe. If I say yes, I shall mean a God that I can not describe."

Here the interview ended. I was not nominated.

THE NATURE OF MAN[1]

A FEW years ago, as you may remember, Élie Metchnikoff published a book entitled *The Nature of Man: Studies in Optimistic Philosophy*. If you have read that interesting work, you know that it is chiefly concerned with the great problem of Death—with the problem, that is, of adjusting human sentiment and human understanding satisfactorily to the common doom of living creatures. In Metchnikoff's view that problem has been mainly responsible for the existence of religions and philosophies. In his opinion religions and philosophies have not been able to deal with the problem satisfactorily; but their failure in the matter, says he, need not make us despair; for it is his conviction—an optimistic conviction—that the problem can be solved satisfactorily by science and in particular by the science of biology, for the process of dying is

[1] Address delivered at the annual meeting of the Columbia University Chapter of the Society of Phi Beta Kappa, May 31, 1921; printed in *Science*, September 9, 1921, and, with slight editorial changes, in the *Hibbert Journal*, January, 1922.

one of the processes of life. And so the book aims at being an important contribution to what might be called the science or the philosophy of death.

I hope this address on "The Nature of Man" may appear to you, as it appears to me, to be likewise a study, or the result of a study, in optimistic philosophy. It is not of death, however, that I intend to speak, but of life. I desire to look toward the possibility—to contemplate the possibility—of a valid philosophy, or a science, of human life.

The core of my message is a certain concept—a concept regarding the essential or distinctive nature of Man. The concept is, I believe, both new and important—strictly new, if I be not mistaken, and tremendously important. This judgment I may express with propriety because the idea in question did not originate with me. I encountered it a little less than a year ago in an unpublished manuscript [2] which by good fortune it became my privilege to examine. And so, the conception

[2] The manuscript has since been published by E. P. Dutton and Company in the form of a book entitled *The Manhood of Humanity: The Science and Art of Human Engineering*, which has been widely read and much discussed.

is mine only by acquaintance, by meditation upon it, by a steadily growing sense of its significance, and by adoption—adoption of it, I mean, as an inspiring idea of great beauty and as a fruitful working hypothesis. The author of it is a Polish nobleman, Count Alfred Korzybski, a native citizen of Warsaw, by temperament a poet and philanthropist, by training and experience a mechanical engineer and soldier, twice wounded in the war; about six years ago transferred as a military expert to North America where, both in the United States and in Canada, he worked hard in the cause of freedom.

The book contains, in my opinion, a momentous contribution to the best thought of these troubled years—momentous in what it contains, even more so in what it suggests, and most of all, I dare say, in the excellent things it will eventually help men and women to think and say and do. I am not going to review it on this occasion. Having examined the work carefully and reflected much upon its core idea, I am convinced that its significance can be grasped and felt, not indeed by reading a review of it nor by listening to one, but

only by reading the work itself, rereading it and pondering it. What I purpose to do is at once something less and something more—I hope a good deal more—than the submission of a review. The work deals with a wide variety of ideas; these do not constitute a mere collection; they constitute a system—the ideas are connected—logically connected—spiritually interlocked in many ways. It happens that among the ideas of the system there is one which dominates all the rest, binding them together, giving them their proper order, their life, their light and their significance—its place in the system is like that of the sun in the solar system. That central idea is Korzybski's concept of Man—a concept of what is the characteristic of humankind; it is, in other words, a thesis purporting to state what that is in virtue of which we humans are human. I desire in the first place to present that thesis, or conception, as clearly as I can, for your consideration both now and in the future; it will be my further aim to indicate, in so far as time allows, some of the bearings it seems to me to have upon the cardinal interests of mankind.

The task is not easy to perform well in the time at our disposal. In trying to perform it, I am going to invite you to join me in an attempt to do a little fundamental thinking. I extend the invitation confidently for the reason that the mood of such thinking is the only mood that befits the times. The World War has indeed constrained us to think about realities as we never thought before, and there is one thing of which we are all of us convinced —it is only by thinking of realities that we may hope to solve the pressing problems of the world. That is a great gain and is full of promise but it is only a beginning.

In this presence it is unnecessary to argue that in dealing with realities it is of the highest importance to have just conceptions of them; I desire to emphasize the prime importance of concepts that correspond to facts; certainly in this presence it is unnecessary to argue that, in order to deal successfully with the great human problems of our times, it is not sufficient to have enthusiasm, sincerity and good will; we know that in addition to these excellent things, it is indispensable to acquire true conceptions of the realities involved.

Now, of all the realities with which we humans have to deal, of all the realities involved in the present perplexities of the world, it is evident that the supreme reality is Man. It follows that of all the questions we human beings can ask—of all the questions which in reflecting upon the ills of our time we *must* ask—the supreme question—the most fundamental question—is: What is Man? What is a human being? What is the defining or characteristic mark of humankind? In the scheme of Nature, what is the place—the distinctive place—of the human class of life?

The sovereign importance of that question seems perfectly evident and is thus evident *a priori*. Have we propounded it to ourselves? In the published thought of recent years I see no sign that we have; if we have, it seems not to have led us to the discovery of anything fundamentally new or fundamentally important. It is safe to say that we have not asked the question—at all events not seriously. And it seems a bit strange that we have not; for many questions closely connected with it and naturally leading to it we have asked. Rudely reminded of the dismal things of human his-

tory, we have asked: What is the explanation of them? Can we prevent their recurrence? And, if so, how? Keenly aware of the present plight of the world, we have asked: What is the cause? Are we under the dominion of a malevolent fate? Or is there a cure? And, if there be a cure, what is the remedy? In trying to answer these great questions, we have been led to ask others—questions about ethical systems or ethical beliefs, about national or racial philosophies, about education, about industrial methods, about economics, about jurisprudence, political science and theories of government. We have beheld the amazing progress of invention, of natural science, of the mathematical and technological sciences; we have seen their swift conquests of space, time, and matter; we have seen our globe thus rapidly reduced to the small dimensions of an ancient province; we have seen many peoples of divers tongues, traditions, customs and institutions consequently constrained to live together as in a single community; we have seen that there is thus demanded a new ethical wisdom, a new legal wisdom, a new educational wisdom, a new industrial wisdom, a new

political wisdom, a new wisdom in the affairs of government. For the new wisdoms our anguished times cry aloud; we have heard the answers—which are in the main but reverberated echoes of the wailing cry mingled with the chattering voices of excited public men who know not what to do. Knowing that the welfare of the world, since it depends at once upon *all* the cardinal forms of human activity, demands team-work of them and therefore *equal* progressiveness in all of them, we have compared the swift advancement of the genuine sciences, on the one hand, with the slow, uncertain, halting pace of the so-called social sciences, on the other; we have been astounded by the contrast; in the crumpled and broken condition of our civilization we behold the appalling consequences of the mighty disparity; and so we have asked why it is that the social sciences—the so-called human sciences—of ethics, education, jurisprudence, economics, politics, and government, have lagged so far behind the forward strides in the other great fields of human activity that the system of human relationships throughout the world has been strained

and torn asunder like an immense network of wire rent by a cyclone. This very important question has led to some curious results. It has led to the invention of doctrines that alarm, to proposals that startle—doctrines and proposals that we are wont to call radical, revolutionary, red.

Is it true that our thinking has been too radical? The trouble is that, in the proper sense of that much abused term, our thinking has not been radical enough. Our questionings have been eager and wide-ranging but our thought has been shallow; it has been emotional and it has been daring but it has not been deep. We have indeed known that the character and status of the so-called human or social sciences depend upon what man *is*; but we have not reflected upon the fact that they depend also, in equal or greater measure, upon what we humans *think* man is. The fact of this fundamental dependence, had we considered it, would have led us to a further reflection—it would have led us to wonder whether the backwardness, the medieval-mindedness, the disastrous lagging of the social sciences may not be due to their having at their base or in

their heart a fundamentally false conception or false conceptions of what is really characteristic of our humankind. It is evident that, if our thinking had reached that point, we could not have failed to ask ourselves the supreme question: What is Man?

Why have we not in these times asked that fundamental question? Doubtless it is because we have assumed, in the main unconsciously, that we know the answer. For why inquire when we are sure we know? Is our assumption of knowledge in this case just? Have we really known, do we know now, what is in fact the idiosyncrasy of the human class of life? Do we critically know what we, as representatives of Man, really are?

Here it is essential to distinguish; we are speaking of knowledge; there is a kind of knowledge that is instinctive—instinctive knowledge—immediate inner knowledge by instinct—the kind of knowledge we mean when we say that we know how to move our arms or that a fish knows how to swim or that a bird knows how to fly. I do not doubt that, in this sense of knowing, we do know what human beings are; it is the kind of

knowledge that a fish has of what fishes are or that a bird has of what birds are. But there is another kind of knowledge—scientific knowledge—knowledge of objects by analyzing them —objective knowledge by concept—conceptual knowledge of objects; it is the kind of knowledge we mean when we say that we know or do not know what a plant is or what a number is. Now we do not suppose fish to have this sort of knowledge of fish; we do not suppose a bird can have a just conception—nor, properly speaking, any conception—of what a bird is. We are speaking of concepts, and our question, you see, is this: Have we humans a just Concept of Man? If we have, it is reasonable to suppose that we inherited it, for so important a thing, had it originated in our time, would have made itself heard of as a grave discovery. So I say that, if we have a just concept of man, it must have come down to us entangled in the mesh of our inherited opinions and must have been taken in, as such opinions are usually taken in, from the common air, by a kind of "cerebral suction."

Well, what are the concepts of man that our generation has thus inherited? Broadly

speaking, they are of two types. One of them is zoological; the other is mythological. Some of us hold the former one; some of us, the latter; and some of us probably hold both of them; for, though they are mutually incompatible, mere incompatibility of two ideas does not necessarily prevent them from finding firm lodgment in the same brain. According to the zoological conception, man is an animal—a kind or species of animal. This conception has at least one merit—it regards human beings as natural—as creatures having a place in the Scheme of Nature. This merit the mythological conception has not; according to it, man has strictly no place in Nature—he is indeed neither natural nor supernatural but is both at once—a kind of miraculous union, compound, or hybrid of the two. Such, then, are the concepts of man that now reign throughout the world and that have so reigned from time immemorial. And such are the concepts that have fashioned our so-called human or social sciences in so far as these have been and are fashioned by what we humans consciously or unconsciously *think* man is.

Are the concepts true? Or rather we must ask—since they can not both of them be true—is one of them true?

It should not amaze us to find that both are false. For the conceptions are man's and their object is man; the difficulty is thus unique; it is that of a self-conscious being having to regard its *kind* as an object and then to conceive rightly what the object is.

In respect of the mythological conception, there are no doubt some who are disposed to treat it ironically as only the other day it was treated by Plato, for example. "We must accept," said he, "the traditions of the men of old times who affirm themselves to be offspring of the gods—that is what they say—and they must surely have known their own ancestors. How can we doubt the word of the children of the gods? Although they give no probable or certain proofs, still, as they declare that they are speaking of what took place in their own family, we must conform to custom and believe them." But this gentle irony—the way of the Greek philosopher—is not the way of the Polish engineer. The latter is indeed not without a blithesome sense of

humor but in this matter he is tremendously in earnest; deeming it to be immeasurably important for all mankind, he treats it with the utmost seriousness; and he bluntly affirms, boldly and confidently, that neither the mythological conception nor the zoological conception of man is true; he denies outright that man is a species of animal and similarly denies that humans are compounds of natural and supernatural.

What is the error in those traditional conceptions? It is, he contends, of the same kind in both of them, and the kind is fundamental; it is the kind of error that consists in what mathematicians call confusion of types and what Korzybski calls mixing of dimensions. Let me explain; I have only to remind you of what everybody knows. And the simplest explanation is the best. You and I may speak of, say, the class of geometric points or of the class of spheres but we can not speak logically of a class composed of points *and* spheres for there is no such class; or we may speak of the class of water-drops or of the class of oceans but not logically of a class of water-drops *and* oceans; the types are different and

must not be confused; to talk as if there were such a class is to talk non-sense, and it would be the same if we tried to discourse rigorously about a class composed of stars *and* rays of light; it would be to chatter as if there were no such thing as logic, or laws of thought. The matter is even clearer in terms of dimensions, or dimensionality; pardon me for dwelling upon it—it is so very important. Here is a straight line—it has length only—it is a one-dimensional thing; it is not a point; it does contain points and has some point properties, but, if on this account, we called it a point, we should be guilty of a type-confusing blunder; next consider a surface, say a plane—it has length and breadth—it is a thing of two dimensions; it contains points and lines and has certain point properties and certain line properties, but we do not call it a point or a line; if we did the blunder would be a dimension-mixing blunder; once more, here is a solid, say a cube—it has length, breadth and thickness—it has three dimensions; it has surfaces and it has certain surface properties, but it is not, therefore, a surface; if we called it a surface or if we were to say it is a surface

mysteriously combined with some miraculous influence from outside the universe of space, then in either case we should be guilty of treason against the eternal law of types or dimensions.

In the light of such elemental considerations we are going to see very soon and, I hope, very clearly what kind of beings we humans are according to Korzybski's concept of Man and at the same time why he condemns the traditional conceptions as false.

Consider the great life classes of our world —consider their patent cardinal distinctions and relations candidly and open-mindedly; and let us begin with the class of plants. I offer, as I need offer, only a rude sketch. Plants, we say, are living things. How are they characterized as a class, positively and negatively? They take in, chemically transform, organize and appropriate the basic energies of the sun, soil and air; but they have not the *autonomous* power to move about in space; together they constitute the lowest order or class or type or dimension of life—say, for convenience, the life dimension I; being, as indicated, binders of the basic energies of the

world, the plants are, in Korzybski's nomenclature, the basic-energy-binding, or chemistry-binding, class of life.

What of animals? What, I mean, are we to say of the creatures traditionally designated as the "lower" animals? Like the plants, animals, too, take in, transform, organize and appropriate the energies of the sun, soil and air, though in a large part they take them already prepared by the plants; but *unlike* the plants, animals possess the autonomous power to move about in space—to creep or crawl or swim or run or fly; it is thus evident that, compared with plants, animals belong to a higher type or dimension of life—say the life dimension II; the classification we are here interested in, you see, is broad; because they are distinguished by their autonomous power to move, to abandon one place and occupy another and so to appropriate the natural fruits of many localities, the animals are called Space-binders—the space-binding class of life.

And now we come to the crux. What are we to say of Man? Like the animals, human beings have the autonomous power to move—the capacity for binding space—for taking

now one and now another "place in the sun" with the goods thereof, and it is plain that, if human beings had no capacity of *higher* order, men, women, and children would indeed be animals. But what are the facts? Be good enough to examine them candidly. They are familiar; let us, if we can, reflect upon them as if they were unfamiliar, for that is half the secret of philosophy and of science too.

Long, long ago, a quarter or half million years ago, there came into existence upon this globe—*no matter how*—a new kind of beings; they did not know what they were; they knew nothing of the world, nothing of its size or shape or place in the universe, nothing of its resources, their locations or properties, nothing of natural law; they were without guiding maxims, precepts or precedents; they had no science, no philosophy, no art, no wealth, no instruments, no history—not even tradition; their ignorance was almost absolute; and yet, compared with the animals, which they hunted and which hunted them, they were marvels of genius; for there was in them a strange new gift—a strange new energy—

that mysterious power in virtue of which they did that most wonderful of all things—they *initiated,* I mean, the creative movement which we, their descendants, call Civilization. Moreover, they were the first members of a race having and transmitting another *gift* hardly less wonderful than the former—I mean the power to make civilization *grow.* Those powers, first manifest in the infancy of our race, are the powers that invent; the powers that imagine, conceive, reason; they are the powers that make philosophy, science, art, and all other forms of material and spiritual wealth; the powers that detect the uniformities of nature, create history and foretell the future; they are the powers that make *progress* possible and actual, discern excellence, acquire wisdom, and in the midst of a hostile world, more and more determine their own destiny. The animals have them not or, if they have, they have them in a measure so small that we may neglect it as mathematicians neglect infinitesimals of higher order. Do not fail to observe how those gifts relate us to that mysterious thing called Time, which so many thinkers—psychologists, philoso-

phers, astronomers, physicists, and mathematicians—are just now as never before engaged in studying, each in his own way. By virtue of those familiar yet ever strange human powers, each generation inherits the fruit of the creative toil of by-gone generations, augments the inheritance, and transmits it to the generations to come; thus the dead survive in the living, destined with the living to greet and bless the yet unborn. If this be poetry it is also fact. Past, Present and Future are not three; in man they are spiritually united to constitute one living reality.

And now we may behold, and are at length prepared to grasp, Korzybski's great Concept. Because this capacity for binding time, under a law of ever-increasing amelioration, is peculiar to man or is at all events his in incomparable degree, the class of human beings is to be conceived and scientifically defined to be the time-binding class of life. We have here, you see, a new dimension, a new type, of life—life-in-time. Animals are binders of space; man is a time-binder.

Allow me a word of caution. Since, like the animals, man, too, binds space, may we not

say that man is a time-binding animal? No; to say that would be the same kind of blunder as to say that a solid is a surface because it has surfaces and some surface properties or to say that fractions are a species of whole numbers because they happen to have some of the properties of whole numbers. It is fatal to confuse types; or to mix dimensions. Time-binding activity—the peculiar mark of man—may involve and often does involve space-binding as a higher involves a lower; but to say that, therefore, man is a species of animal—a time-binding species thereof—is like saying that a solid is a species of surface or that water is a species of oxygen or that wine is a species of water or that a violin is a species of wood or that definite integration is a species of addition or that a symphony is just a species of sound.

Such, then, is the new *defining* conception of Man—the conception of a being whose *distinctive* character and appropriate dignity consist in his peculiar capacity or power for binding time. The nobility of the conception is obvious, unmistakable. It has two other marks that belong to all really great ideas—

it is intelligible to all and is universal in its interest and appeal. Your sense of its significance will grow as you meditate upon it, for its significance, I do not doubt, is mighty. The author, I believe, is right in his belief that it marks the beginning and will guide the development of humanity's manhood. I wish it were possible to examine here some of its bearings on the cardinal interests of mankind; but "the hour contracts" and I can do no more than barely allude to a few salient considerations.

One of them is that, though we human beings are indeed not a species of animal, we are natural beings: It is as natural for humans to bind time as it is natural for animals *not* to do so.

That fact is fundamental. Another one, also fundamental, is this: Time-binding power—the characteristic of humanity—is not an effect of civilization but is its cause; it is not a civilized energy, it is the energy that *civilizes;* it is not produced by wealth, whether material or spiritual, but is the source and creator of both.

I come now to the gravest of considerations.

Inasmuch as time-binding is the characteristic of humanity, to study and understand man is to study and understand the nature of his time-binding energies; the laws of human nature are the natural laws of these energies; to discover these laws is a task of supreme importance for it is evident that upon the natural laws of time-binding must be based the future science and art of human life and human welfare.

One of the laws we already know—not indeed precisely—but fairly well—we know its general type—and it merits our attention. It is the natural law of progress in time-binding, or civilization-building. Let us glance at it. Each generation of (say) beavers begins where the preceding generation began and ends where it ended: that is the law for animals—there is no advancement, no time-binding—a beaver dam is a beaver dam. Contrast this with human life. Man invents and discovers and creates. An invention or discovery or creation once achieved, what happens? Each invention leads to new inventions, each discovery to new discoveries, each creation to new creations; invention breeds invention,

science begets science, the children of knowledge and art and wisdom produce their kind in larger and larger families; each generation begins, not where its predecessor began, but where it *ended;* the Past survives in the living achievements of the dead; the body of these achievements—invention, science, art, wisdom—is the living Capital of the ever-passing Present, inherited to be held in trust for enlargement and for transmission to future man; Past and Future are united in an eternal Now; the process is that of time-binding. There is continual *progress.* What is the Law thereof—the natural law? You see at once what it is: It is that of a rapidly increasing Geometric progression—if P be the progress made in a *given* generation, called the first, and if R be the ratio, then the progress made in the second generation is PR, that in the third is PR^2, and that made in the single T*th* generation will be PR^{T-1}. Observe that R is a large number and that the time T enters as an exponent and so the expression PR^{T-1} is called an exponential function of time. This is an amazing function; as T increases, the function not only increases but does so at a rate

which itself increases according to a similar law, and the rate of increase of the rate of increase again increases in like manner, and so on endlessly, thus sweeping on toward infinity in a way that is truly marvelous. Yet that is the law—the natural law—for the advancement of civilization—immortal offspring of the marriage of Time and human toil.

And here arises a great question which I have hardly time enough to touch. The question is: Has civilization always advanced in accord with the mentioned law? And, if not, why not? The time-binding energies of man have been in operation long—300,000 to 500,000 years, according to the witness of human relics, ruins and records of the caves and the rocks. If progress had followed the mentioned law throughout that vast period, our planet would no doubt be now clothed with a civilization so advanced that we are powerless to imagine it or to conceive it or even to conjecture it in dreams. And yet that law is a *natural* law of the time-binding energies of man. What has been the trouble? What the main trouble has been is pretty plain. As already

said, what we Human beings do depends not merely upon what we *are* but, in equal or greater measure, upon what we *think* we are. From time immemorial the characteristic energies of our humankind have been hampered by the false conception that man is a species of animal and hampered by the false conception that man is a miraculous mixture of natural and supernatural. Throughout the long period of our race's childhood, from which we have not yet emerged, those misconceptions have lain athwart the course of civilization. All that is precious in present civilization has been accomplished in spite of them. The goods, the glorious achievements, of which they have *deprived* the world we can not now know, but the subtle ramifications of their positive evil we can trace in a thousand ways. And it is your duty and mine to trace them. Whoever performs the duty will be appalled. I cannot dwell upon the matter here. Suffice it to say that, if we humans do not in fact constitute a perfectly natural class of life, then there never has been and never can be a human ethics having the understandability, the sanction and the au-

thority of natural law; if we do constitute such a class of life but continue to *think* that we do *not,* the result will be much the same—our ethics will continue to carry the confusion and darkness produced by the presence in it of mythological elements. If, on the other hand, human beings continue to regard mankind as a species of animal, then the social life of the world in all its aspects will continue to reflect the misconception; especially our ethics, which subtly pervades, colors and fashions all of the social sciences, will continue to be—what it always has been in large measure—a zoological ethics, animal ethics, the ethics of tooth and claw, space-binding ethics, the ethics of strife, violence, combat and war.

So it has been, but it will not continue so to be if we have the wisdom to learn the fundamental lesson of our recent experience. What is that lesson? It is this: The World War was an unforeseen, sudden, cataclysmic demonstration of human ignorance of human nature—a demonstration, pitiless as fate or famine, that human beings have never rightly conceived Man to be what Man is—not a mixture of natural and supernatural nor a species

of animal, but the *natural agency for those time-binding energies in the world whose peculiar function it is to produce Civilization* and to do so in accord with the marvelous law of an increasing exponential function of Time.

That conception will be found, I believe, to initiate a new epoch—the epoch of humanity's manhood. The concept is easy to grasp—all, and especially the *young,* can understand it. Once it is understood and *felt,* human life will accord with human nature, the time-binding energies will be freed from the old bondage, and civilization will at length advance in accord with its natural law as the great forward-leaping exponential function of Time. There will be great changes and many transfigurations. Education in home, school and church will have for its supreme function to teach the children of man to understand and to feel what man is and what they are. Ethics will abandon the space-binding standards of animals and will become *human* ethics based upon the natural laws of the time-binding energies of man. Freedom will be freedom to live in accord with those laws and righteousness will be the quality of life that does not

contravene them. The social sciences of ethics, education, economics, politics and government will become what they never have been—genuine sciences; these fashioned by a just conception of man, will cooperate to fashion the state; and the state, which may ultimately embrace the world, will rescue itself from ignorant politicians and commit its destiny to the guidance of *honest* men who *know*.

And when guided by honest men who know —when guided, that is by the coming science of human engineering, which will be intelligence applied to human affairs—when thus guided in the light of the true conception of man as the binder of Time—then and only then our human civilization—the living issue of time-binding toil, mainly that of the dead —will advance, not haltingly as hitherto, but, as said, in accord with the natural law thereof, in a warless world, swiftly and endlessly.

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